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"Most Perishable of the Arts"

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IN his fascinating *Apology*, Colley Cibber described the art of acting and the profession which he so much adorned as the "most perishable of the arts." Although this lament has been often expressed in the two hundred years since the *Apology* was published, we are not so sure that Colley was right. At any rate it will give us a starting point from which to make a few observations on acting with special attention to the eighteenth century.

For something over three centuries, the English theatre has reflected with remarkable faithfulness the varying phases of human life and human institutions. It would not be easy to name another art which has registered so accurately and so sympathetically the

various activities, social conditions, and changing ideals of perhaps the most interesting period in world history. At the risk of making a dogmatic generalization, we may characterize the three centuries, not too strictly confined by figures, the seventeenth as of great drama, the greatest we have known, the eighteenth of great actors, the greatest we have known, and the nineteenth, notable for the advance made in the presentation of the plays, calling to assistance the achievements of the arts and sciences to a degree never dreamed of before.

It was in the eighteenth century that the actor really came into his own. Burbage, Alleyn, Shakespeare, Betterton, and Mrs. Bracegirdle had been before, and possibly their acting has not been surpassed, but they were not sharers of the prestige of the dramatists of the period. Our information about them is very meagre. Although the general reader can name several of the dramatists contemporary with Shakespeare, to name more than one or two of the actors would take a specialist. The actor, not the author, fixes the attention of posterity in the history of the Georgian theatre. As a contrast with the Elizabethans, Macklin, Barry, Peg Woffington, Garrick, Foote, Siddons, Kemble, and Kean do not have to yield to Home, Rowe, Colman, Murphy, Hill, D'Urfey, Lillo, and Holcroft.

It remained for the eighteenth century not only to produce many great actors and actresses, but to leave records of their personalities, vivid descriptions of some of their great moments, and a complete picture of the theatre life. Seldom has literary history possessed more satisfactory and authoritative material from which to construct the world of an earlier day.

It was the heyday for the theatre as for the actor. Persons of all classes went to the play and followed with enthusiasm the fortunes of their favorite actors and actresses. Probably at no time has the playhouse, stage, and audience come nearer to the people and reflected for them the full life of the time. The theatre kept the people together and gave them *en masse* something to talk about and think about. The novel had not yet come into the power which would produce readers and individual entertainment.

So the actors became the center of attraction. The playhouse and play were secondary to the players. Have you seen Barry, or

Garrick, or Siddons, was the question. Actors became popular. "There is no class of society," wrote Hazlitt, "whom so many persons regard with affection as actors," and declared that the public cared more for John Kemble in a plain coat than for the Lord Chancellor on the woolsack. There are obvious reasons for this interest and affection on the part of the public. The actor appears in person, and to gratify the beholders he places himself in situations which make an appeal to their sense of beauty or their emotions. He cannot withdraw, like the poet or painter, to an ivory tower. He is there to be liked or abused.

As interest in the actor has grown, there has persisted a curious ignorance of the art of acting, that it consists of little more than walking on the stage and repeating some declamations. To illustrate this popular disregard of the principles of acting and the purposes of the art, Brander Matthews liked to quote the remark of the commercial traveler to the famous comedian, John Drew: "Mr. Drew, I don't see how you manage to think of so many clever things to say on the stage. I wish I could learn to do that offhand. It would be mighty useful to me in my business." Something of the same conception appears in the dislike of the spectator to see the actor come before the curtain after having been killed in the tragic ending only a few minutes before.

To those who think that acting is really no art at all, but a mere sedulous copying of nature, H. B. Irving cites a passage from Coleridge. "A great actor, comic or tragic, is not to be a mere copy, a fac-simile, but an imitation of nature. Now an imitation differs from a copy in this, that it of necessity implies and demands a difference, whereas a copy aims at identity; and what a marble peach on the mantelpiece, that you take up deluded and put down with a pettish disgust, is compared with a fruit piece of Vanhuysen's, even such is a mere copy of nature, with a true histrionic imitation."

Perhaps Bronson Howard has given the best and simplest definition. "The art of acting is the art of *seeming* to move, speak and appear on the stage as the character assumed moves, speaks and appears in real life under the circumstances indicated in the play."

That even a good actor fails to make the distinction between

mere copying and artistic representation is shown by the remark of a French actor: "I was real as I would have been at home. I ought to have been real in another way, in accord with the perspective of the theatre."

So we are presented with the impossibility of taking the tramp from the street, the maid from the kitchen, or the lady from her afternoon tea and have each fit into the stage picture without an observance of the rules of acting. That acting is translating rather than copying has been aptly expressed by Stark Young. "Acting is the business of translating into the terms of human beings certain matter taken either from life direct or from drama of thought and action that has been created out of life."

Like all other artists, the actor may not forget the tools of his trade, the members of his own body, his hands, arms, walk and gesture, the glance of his eye and the tone of his voice. "These are the implements of his art, these are his chisel and his marble, his brushes, his palette and his canvas." And Stark Young again declares that, "Not the actor's voice, not the brain, are the parts of him by which he becomes a medium of his art, it is his whole make-up, body, brain, and voice, it is the man you see before you on the stage."

Although some of the best actors have been persons of intellect and proved scholarship, the absence of such endowment has not seemed a hindrance to success. Mrs. Siddons, distinguished for her presentation of Lady Macbeth, wrote a paper attempting to discuss the play which was mediocre, to speak generously. It takes more than mere rhythmic repetition to hold the listener, but the power of mere rhythmic repetition can be very effective. Garrick, who was always seeking persons from whom he might learn, often went to The Tabernacle to hear Whitefield preach. One day he remarked that the preacher had the power of speaking the word Mesopotamia in such a manner that he could have the whole audience in tears.

Madame Modjeska on one occasion was asked to recite in Polish. She demurred at first, then consented. The occasion was described by Brander Matthews. "She began to repeat a strongly rhythmic composition, unintelligible of course to her hearers, although they could catch the occurrence of the same sounds at

intervals. At first it seemed simple enough, apparently with some give and take of question and answer; and then it became pathetic, and as she spoke the saddening words the voice of the accomplished actress broke. There was almost a sob in her tones and there were tears ready to fall from her eyes. Her husband, the one person in the room who could understand Polish, had to leave the room to restrain his laughter, because what she was delivering thus emotionally was the multiplication table."

It is difficult at different periods to select those elements which may be considered advantages or the reverse, because sometimes by those very disadvantages genius overcomes obstacles and steps to the front. Nevertheless, the eighteenth-century theatre seems to have been just ripe for the great season which came along.

Fortunately, women had begun to take their parts and it was no longer necessary to put up with the cracked voice of an adolescent boy speaking the lovely words of Rosalind, Perdita, Cordelia, Portia, and the score of beautiful characters that Shakespeare had made. One can hardly realize a stage where all the parts were taken by men, but so it was for many decades. At times the ridiculousness of it must have been felt, but there are few signs of dissatisfaction of the audience, even on the occasion when King Charles grew tired of waiting for the play to begin and a messenger sent to inquire the reason for the delay returned with the word that "the queen was being shaved."

One decided advantage of the eighteenth century was the prevalence of short runs. For a play to continue more than twenty times was something unusual, perhaps what now would be a year or two of a New York production. Correspondingly, the players did not act so often. For Garrick the average in his thirty-six years of acting was about seventy performances for the year. This custom kept the actors on their mettle to learn a number of plays each year, and it gave them the opportunity to show their versatility and keep up their enthusiasm. Contrast the situation with Garrick's Hamlet, Macbeth, Lear, Macklin's Shylock, Mrs. Siddons' Lady Macbeth appearing only a score of times in the same season with the situation when *Tobacco Road, Life with Father, Abie's Irish Rose* ran for several years.

The scenery on the eighteenth-century stage was a little more elaborate than in Shakespeare's day, but very inadequate according to our standards. It seemed to have no greater importance in the play than in the preceding century. As to the costumes, they were not yet a subject of historical research. Often expensive and lavish, costumes with historic accuracy had not yet been seriously considered either by actors or managers. Barry as Hamlet appeared in black court dress with the ribbon of the Danish *Order of the Elephant* across his breast. Garrick played Macbeth in a blue and red suit trimmed with gold and with a short powdered wig, and we are accustomed to the portraits of Mrs. Siddons as Queen in *Hamlet* or Lady Macbeth in hoops and feathers. Even Garrick with all his important reforms in play-presentation did not go far in changing the ideas about dress on the stage.

Another advantage was the character of the pit and its relation to the actors. There were no longer mere "groundlings" as they were called in Shakespeare's day, or "undertakers" as in the Restoration, but the pit was that part of the theatre where people came who really wanted to see the play, not so much those who wished to be seen—poets, critics, actors, "merchants from the city with big-wigs, lawyers from the temple with big-wigs, and physicians from the coffee-houses with big-wigs." Sometimes riots were caused by accidents between pit and stage. At one performance of *Macbeth* a noble but drunk earl, standing in the wings, crossed to talk to a friend. Rich, the manager, expostulated for his breach of decorum and he slapped the manager's face. Thereupon Quin and two other actors drew their swords, the earl and friends rushed into the boxes and began to slash about. The watch was called in and restored order before much damage was done. Something of this sort occurred with considerable frequency.

There were humorous incidents, as when "lovely" Peg Woffington was acting Cordelia in *King Lear*. A gentleman of the pit was so enamored of her beauty that he hastened upon the stage and embraced her in the sight of the audience. On the first occasion when the two famous actors, Quin and Garrick, were playing together in the same piece, Rowe's tragedy, *The Fair Penitent*, it is said that the applause was so prolonged that both actors were unnerved.

"Quin is said to have changed colour; Garrick was ill at ease and embarrassed. Quin, as Horatio, played the part of an honest and courageous friend; Garrick, as Lothario, that of a dissolute and heartless libertine. Quin laboured heavily and ineffectually through the part of Horatio. When Lothario challenges him to meet him in deadly combat,

> West of the town, a mile among the rocks,
> Two hours ere noon, to-morrow I expect thee,
> Thy single hand in mine,

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Quin, as Horatio, had merely to reply with calm courage:

> I'll meet thee there.

But that was not Quin's way. After Garrick had spoken his challenge, a tremendous pause ensued—so long that at last one called out to Quin: 'Why don't you tell the gentleman whether you'll meet him or not?' When at length the long-delayed answer was given, it was delivered with such slowness and elaboration as to be ridiculous."

This incident illustrates the change taking place in the transition from Betterton to Garrick, the passing from the time when "Declamation roared while passion slept." Quin gave voice to the sentiment of the old and dying school on the emergence of his rival, Garrick, "We are all wrong if this fellow is right." And when Macklin against the opposition of a timid conventional manager insisted that Shylock be a tragic figure, he was received with the applause of the pit which had been accustomed to roar with laughter at the rantings of Shylock. "Now a shudder runs through the audience when he discovers that his daughter has fled with the ducats." Pope said

> This is the Jew
> That Shakespeare drew.

And the new era had come.

There is no more interesting reading than the descriptions of some of the great moments in the lives of the great actors from Betterton to Garrick, Mrs. Siddons and Kean in vivid passages of the memoirs of the actors or the appreciative criticism of Leigh Hunt, Hazlitt, and Lamb in the following century. Of Betterton

Colley Cibber wrote, of the ghost scene in *Hamlet:* "Betterton was the first to give to the scene its real significance; it was with mute amazement he first looked on his dear father's spirit, and then in a solemn, trembling voice, which made the ghost as terrible to the spectators as to himself, with awe and reverence, from which all thought of violence or defiance was banished, he addressed the spirit."

Of the famous performances during one season at Drury Lane and Covent Garden when Garrick acted Romeo at one and Barry the same part at the other house, an actress, not identified, exclaimed: "Had I been Juliet to Garrick's Romeo, so ardent and impassioned was he, I should have expected that he would *come up* to me in the balcony; but had I been Juliet to Barry's Romeo, so tender, so eloquent, and so seductive was he, I should certainly have *gone down* to him."

Hazlitt records the following experience: "I have heard that once, when Garrick was acting Lear, the spectators in the front row of the pit, not being able to see him well in his kneeling scene, where he utters the curse, rose up, when those behind them, not willing to interrupt the scene by remonstrating, immediately rose too, and in this manner, the whole pit rose up, without uttering a syllable, so that you might hear a pin drop. At another time the crown of straw which he wore in the same character fell off, or was discomposed, which would have produced a burst of laughter at any actor to whom such an accident had happened, but such was the deep interest in the character and such the power of rivetting the attention possessed by this actor, that not the slightest notice was taken of the circumstance, but the whole audience remained bathed in silent tears."

During the eighteenth century there was growing respect for the profession as well as an increase in affection for the actor. It will be remembered that Garrick seemed to hesitate to adopt his chosen work until the death of his mother, and also that his chief concern after his initial success was the feeling of his brother that he had brought disgrace upon the family. In deep contrition David wrote to Peter, his partner in the wine business, "I hope when you find that I may have the genius of an actor without the vices, you will

think less severe of me, and not be ashamed to own me for a Brother."

Of course, this change in the social position of the actor was due in part to more serious study and wider reading on the part of the actors, and the challenge which the playing of varied characters in well-known plays made upon them.

This incident is often mentioned. Garrick had known an unfortunate man in Goodman's Fields who playing one day at an upper window with his two-year-old child, let it fall from his arms to the area below. The child was killed and the father lost speech and reason. He passed the rest of his life in going to a window, in imagination playing with the child, dropping it, then filling the house with cries of anguish. Then he would sit down, pensive and still.

"There it was," said Garrick, "that I learned to imitate madness. To that I owed my success in King Lear."

From the day of Colley Cibber even to the present time there has been heard the familiar lament on the evanescence of the actor's art. It is common to refer to the lines of Garrick in his prologue to *The Clandestine Marriage,* a famous play of the time.

> "The painter dead, yet still he charms the eye;
> While England lives, his fame can never die;
> But he who struts his hour upon the stage
> Can scarce extend his fame for half an age;
> Nor pen, nor pencil can the actor save;
> The art, and artist, share one common grave—
> Your children cannot feel what you have known
> They'll boast of Quins and Cibbers of their own."

In our time Lawrence Barrett related an anecdote of Michaelangelo: "To please some exacting patron or to gratify a whim of his own, the great artist once carved a statue of snow. This may have been the final expression of his plastic genius, but it endured only until the sun shone again. Then it melted swiftly into a shapeless lump, and soon it was gone forever, leaving no record of its powerful beauty." And this is what the actor does every night, he is forever carving a statue of snow!

And George H. Lewes wrote of Macready: "The painter leaves behind him pictures to attest his power, the author leaves behind him books, the actor leaves only a tradition. The curtain falls—the

artist is annihilated. Succeeding generations may be told of his genius, none can test it."

But there *is* another side. No one of the arts can bring to the artist a greater satisfaction during his lifetime, his moments of exaltation, his insight into some of the great creations of drama—Coleridge said Kean's acting was reading Shakespeare by "electric flashes"—his feelings of sympathy with his fellow men, the opportunity afforded to the serious actor to perfect himself. Brander Matthews has indicated in the passage just quoted from Lewes that though he seems to leave nothing to posterity, no one can assail his position. The poet or the painter may pass through periods of neglect, but the actor once having established his position cannot be dislodged. In this he has perhaps an advantage over the orator or preacher. Perhaps there is yet another reward which Cibber failed to recognize. Even Johnson who had no great love for acting or the actor wrote the couplet,

> Sometimes with Garrick's noble rage
> You catch the fire of Shakespeare's page.

Characters are made to live by actors. Of Mlle. Clairon in his *Electra,* Voltaire once remarked, "It is not I who did that—she did it! She has really created the character."

Different techniques in the presentation of the famous characters have been handed down by the great actors—the ghost scene from Betterton, Shylock from Macklin, Lear and Macbeth from Garrick, Lady Macbeth from Mrs. Siddons, Hamlet from Kean.

No finer tribute to the actor has been paid than by Richard Steele in *The Tatler* following the death of Betterton, whom "I have always very much admired and from whose acting I have received more strong expressions of what is great and noble in human nature than from the arguments of the most solid philosophers, or the description of the most charming poets I have ever read."

In the presence of such a generous expression from one so fine as Dick Steele at his best, we do not accept so unreservedly the lament of dear old Colley Cibber that acting is "the most perishable of the arts."

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The Separation of Uranium 235

By WILLIAM H. JONES

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THE splitting of the uranium atom, with the consequent enormous release of energy, has been successful only with those atoms weighing 235. Wherever uranium occurs in nature, it is always made up of two atomic species, called *isotopes*, in the proportion of only one of the desired 235-weight atoms to 140 of the relatively useless 238 variety. Thus, after mining the ore and refining the metal itself, the resulting pure uranium would, from the atomic energy standpoint, be labeled "Active Ingredient 0.7%; Inert 99.3%." The Smyth report[1] states that the primary purpose of the operations at Oak Ridge, Tennessee, was the separation of the 235 isotope of uranium for use in atomic bombs.

This separation is a major problem, because a pair of isotopes have practically identical chemical behavior; indeed, they are chemically the same substance. If the chemist is asked to separate uranium from lead, or from vanadium, or from some other element, the problem is duck soup to him; he simply adds some chemical toward which uranium and the other element react differently. But when the chemist is asked to separate uranium from uranium, he is quick to point out that that is quite a different problem—and a much more difficult one. In fact, until the Manhattan District operations were undertaken, the complete separation of isotopes had not been accomplished in quantity in the case of any element except hydrogen.

Since the prospects for uranium separation are not nearly as favorable as for hydrogen, suppose we examine somewhat more in

[1] Henry DeWolf Smyth, *Atomic Energy for Military Purposes* (Princeton, Princeton University Press, 1945).

detail the methods available, and try to evaluate their probable effectiveness. One of the first things to become apparent in our survey is that, of the seven methods available, six are based on probabilities, that is to say, on the *average* behavior of *groups* of atoms. Such methods are referred to as *statistical* methods, in recognition of the fact that we cannot predict with certainty what the performance of an individual atom will be when the method is applied; we can only quote statistics showing the odds in favor of the desired result.

The use of a statistical method for the separation of isotopes might be compared to the process of winnowing grain. After threshing his wheat or shelling his corn, the farmer may further clean it by spreading a cloth on the ground, and pouring the grain onto it in a thin stream from a bucket held above his head. If a

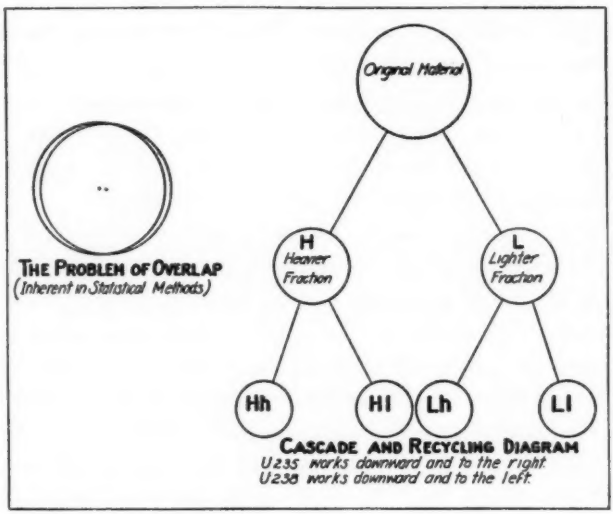

Figure 1

steady breeze is blowing, the chaff, bits of husk, and such lighter particles are carried to one side, while the sound grain falls on the cloth.

If the atoms of uranium are thought of as grains of wheat or corn, and a process analogous to winnowing is applied, we might

expect the lighter atoms to be carried farther to one side than are the heavier. This is indeed the case, and our expectations can be realized *on the average*. If we now halve the mound of atomic grain, the down-wind half will be slightly richer in the desired 235-weight atoms than was the original material. Remember, however, the overlapping in the heap is so great that the result is not a clean-cut separation, but is a minute enrichment of the desired isotope in the leeward side of the mound, and a corresponding slight depletion to windward.

This situation is represented in the diagram on the left of Figure 1. Here we see two circles, each representing the area within which the atoms of one type would land. The separation accomplished is then represented by the second circle being displaced slightly sidewise with respect to the first. Suppose an *average* separation of 1% has been achieved, as pictured by the centers of the circles being a unit distance apart. If we now by a vertical line divide the entire heap exactly in half, and take the atomic census of either half, we shall find the isotopes present in the proportions of 50½ to 49½, instead of the original fifty-fifty.

This result is unimpressive in itself, but it points the way to success. We need now to take the richer half of the heap and winnow it again; the leeward portion then resulting will be richer than ever in the 235 isotope. By repeated winnowings, plus a systematic procedure for recombining portions having similar enrichment, the separation may ultimately be made practically complete. For example, one of the available methods is able to produce uranium in which the 235 isotope constitutes 99%; to do so requires about 4,000 winnowings.

A suitable scheme of this nature is diagrammed on the right of Figure 1. The original sample, represented by the large circle, is "winnowed" by a breeze which we will imagine as moving from left to right. A small separation is achieved, and the resulting heap is divided into a lighter half, pictured to the right, and a heavier half to the left. Each of these portions when winnowed will in turn yield a lighter and a heavier half, as pictured on the next line. Obviously the portion richest in the 235 isotope is the one on the lower right, since it is the lighter half of the lighter half of the

original. Conversely, the lower left is the sample most impoverished in 235, being the heavier half of the heavier half. The other two portions, being respectively the lighter half of the heavier half, and the heavier half of the lighter half, are of about the same composition; they are mixed and returned to the beginning of the process. In a plant using such a scheme, each unit operation is called a *stage*, and the entire system is a *cascade*.

The characteristics of statistical methods are implied in these diagrams. Most significantly, such methods produce a small enrichment in a large quantity of material. Consequently a complete separation would require a cascade scheme of many stages. By the same token, such plants generally have a large *hold-up*. This means that when the plant is in steady operation, with a certain daily intake of material to be processed, there will be many times this amount of material tied up in the multiple stages of the plant itself.

Moreover, such plants may be expected to have a relatively long *start-up* time, running into weeks or even months. It is suggested by the cascade diagram that it will take considerable time before equilibrium is attained, and each stage of the plant becomes filled with material of the proper degree of enrichment for that stage—before, in other words, the plant settles down to the production of the daily quota of uranium 235 for which it was designed.

The six statistical methods for isotope concentration known before 1940 may be listed as gaseous diffusion, distillation, centrifugation, thermal diffusion, exchange reactions, and electrolysis The two of these indicated by preliminary experiments to be most promising for uranium were thermal diffusion and gaseous diffusion. Both have been successfully used for quantity production at Oak Ridge.

The Thermal Diffusion Method

is considered to have originated about 1920. At that time the observation was made that subjecting a mixed gas to a temperature gradient tended to cause one type of molecule to concentrate in the cold region, and the other in the hot. The theory of the effect is complicated, but the results are definite, and are found to apply to isotopes of the same substance as well as to molecules of

different substances, and to the liquid state as well as the gaseous.

If we should imagine a closed metallic box filled with a gaseous or liquid compound of uranium, and arrange to keep the top of the box hot, while chilling the bottom, we should have the simplest form of thermal diffusion. The theory predicts that the thermal agitation will work the 235 atoms preferentially toward the hot surface, and the 238's toward the cold. The result is typical of statistical methods; there is no finished separation, but a *tiny relative* enrichment of the 235 isotope in the hot region of the box.

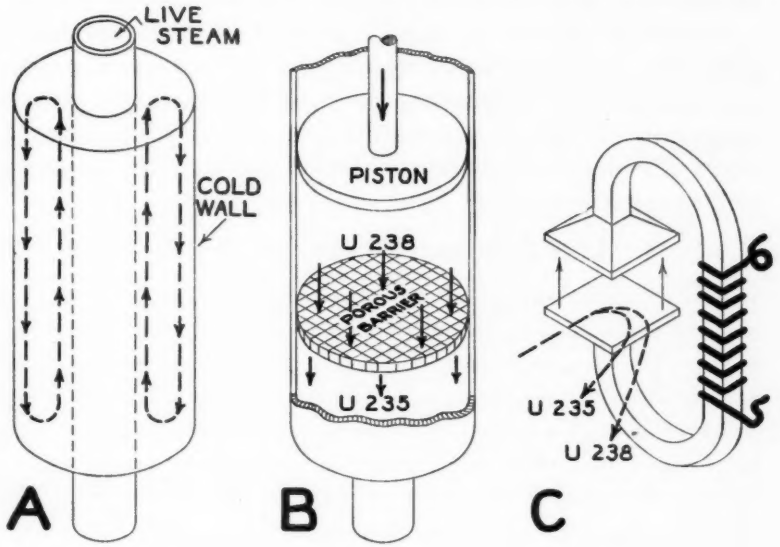

Figure 2

If thermal diffusion is combined with thermal circulation, however, the results are notably improved. Such a combination may be illustrated with the same box, simply by applying the heating and cooling to two opposite sides, rather than to the top and bottom. As before, the 235 slightly concentrates in the region of the hot wall, but now the convection currents rising near the hot wall slowly sweep the concentrated 235 toward the top of the box. Further thermal diffusion then occurs to replace the 235 carried upward, and so the process continues. How far the separation will proceed

in a sealed vessel is determined by many factors, including the temperatures and pressures used, the dimensions of the vessel, and so forth.

The simplified diagram (Figure 2, A) more nearly pictures the actual construction. Two tubes are arranged one inside the other, with the innermost containing live steam, and the outer cooled by a water jacket [not shown]. The uranium in the form of the hexafluoride is placed in the space between. The 235 isotope preferentially moves inward and upward, and the enriched material may be drawn off from the top of the tube as it accumulates.

Ground was broken at Oak Ridge for a plant of this type on July 13th, 1944, and just 66 working days later it was in production. Though small compared to other installations in that area, its comparative cheapness and rapidity of construction, and its simplicity of design and operation, enabled it to contribute importantly to the project as a whole.

The Gaseous Diffusion Method

is based on our concept of the molecules of a gas as being in a state of continuous agitation, darting about in all directions. This picture would immediately suggest that the lighter molecules would be the faster moving. Since the diffusion of a gas under pressure through a porous material essentially consists in the molecules blundering their way along the passages or pores leading through the material, it would follow here as elsewhere, that "The race is to the swift." Thus the faster, and that is to say, the *lighter,* molecules would get through more readily, and would predominate in the first portion of gas to emerge. This is pictured in the second diagram of Figure 2 (B), in which we see the molecules diffusing through a porous partition called a *barrier.*

As before, the separation is small; theory would predict for uranium a factor of 1.0043. This means that in the first tiny portion to emerge from the barrier, the 235 content should be 1.0043 times as great as it was before diffusion. Yet this small value would apply only to the very first emerging portion. All subsequent portions would be diffusing from an already-depleted sample, and the 235 content would come down accordingly. For instance, if half

the original sample is diffused through, the factor in theory comes down to 1.0030, and in practice to even less. Nevertheless, the method can, by operating in a cascade of successive stages, bring about large separations of uranium 235.

The technical difficulties in the construction and operation of such a plant seem all but insurmountable. The separation factor is so low that for each portion of 235 emerging from the final stage of the cascade, over 100,000 times its volume of material has to be cycled and recycled through the earlier stages.

Moreover, the uranium material itself is very corrosive. All parts of the circuit must therefore be of corrosion-resistant construction, hermetically sealed, and free of any lubricant which might contaminate the contents. The design of pumps to meet this requirement proved an especially serious difficulty, calling for great ingenuity in its solution.

Calculations showed that the barriers used, to be effective, must have almost no pores larger than 4 ten-millionths of an inch in diameter, but must have billions of pores of this size or smaller. These pores must not become enlarged or eaten out by corrosion, nor plugged by dust or foreign material. The barrier must, moreover, be able to withstand the pressures at which the gas is pumped. Lastly, the material must be suitable for manufacture in uniform quality and in large quantity, since calculations showed that the completed cascade would require a total of many acres of barrier surface.

Despite the magnitude of these problems, their solution was sufficiently advanced by January 1943 that the construction of a gaseous diffusion plant was authorized. Construction was under way by late summer of that year, and the plant was producing in quantity by the spring of 1945.

The Electromagnetic Method

is an adaptation of the mass spectrograph to quantity production. This device had been used since about 1918 as a laboratory test instrument for measuring the relative abundance of isotopes in natural materials. In fact, it is largely by the use of the mass

spectrograph that the plants already described have been able to analyze their product and judge their progress.

The diagram on the right of Figure 2 (C) shows the essential principle of such an instrument. In a chamber called the *source,* not pictured on the diagram, atoms of uranium in vapor form are *ionized;* that is, they are given a positive charge, under conditions of high vacuum. Now that the atom is charged, it may be pushed and pulled about by electrical fields in accordance with laws of repulsion and attraction. Such a field is used to "bunch" the charged atoms, called *ions,* and draw them in the desired direction, meanwhile accelerating them to great velocities.

The resulting refined beam is seen as entering the diagram from the lower left. Here it encounters the field of a powerful electromagnet. When it strikes this field, the ion behaves rather like a car going into a skid. If the magnet poles are placed as shown, the magnetic forces cause the speeding ion to swing in a circle to the right. The helpful part is that the heavier the ion used, the greater the diameter of the circle. As the drawing implies, the 235 and 238 ions will emerge from the field at two different points. To complete the separation, it is only necessary to have an appropriate receiving vessel at each point.

Here we recognize a method that is essentially *not* statistical in nature. When the instrument is working properly, all 235's are focussed at one point, and all 238's at the other. Where an individual ion will land no longer involves a discussion of probabilities. The separation is complete in a single stage; there is no scattering and no overlap.

These merits sound so convincing that you will probably wonder why any other method was ever considered. The answer lies in the small yield produced. In the best mass spectrographs up to 1941, continuous operation for a 16-hour day would separate less than a millionth of a gram of pure uranium 235.

Discouraging as this might sound, a plant operating on this basis would still have the advantage of complete separation in a single stage, plus negligible start-up time, and almost no hold-up. Such a plant could be built piecemeal, each unit going into full production as soon as installed. The plant output could be con-

trolled at will, by shutting down individual units or adding more.

All in all, the method had such appeal that an intensive search was begun in 1941 for means of improving the yield. For this purpose the University of California cyclotron was dismantled, and its electromagnet was used to construct a mass spectrograph of hitherto unheard-of size. Because of the origin of the magnet and the location of the work at California U, this instrument was named the "cal-u-tron."

I might point out that this circumstance has also led to what is probably the most persistent misconception in the entire operations at Oak Ridge, namely that "They are using cyclotrons there to split the atom." The cyclotron and the calutron both use an electromagnet, but there is no other resemblance.

The results of these experiments at California were so encouraging that that university's unfinished "giant" cyclotron, containing the largest electromagnet in the world, soon went the same way. The resulting calutron, aided by significant improvements in the design of its ion source, field controls, and other details, was able to produce some 10 milligrams of uranium 235 per day. True, this is less than a thousandth part of an ounce, *but*—at that rate, 100,000 calutrons could produce two pounds per day.

The consequence of these experiments and of this simple arithmetic, was the authorization in November 1942 of the construction of an electromagnetic separation plant at Oak Ridge. Construction began in March 1943, and the first units began to produce in November of the same year. By late 1944 the plant was in large-scale operation, producing uranium 235 of quality suitable for atomic bombs.

Of Emily Dickinson in Spring

By JAMES E. WARREN, JR.

Mr. Warren will shortly publish a second volume of his poems, to be entitled AGAINST THE FURIOUS MEN. *In the verses that follow he presents a charming and amusing experiment in adapting the mannerisms of American poetry's most fugitive genius.*

Wind at the door! I hurry.
A sudden tree has come,
Presenting with a flourish
Its emerald telegram—

From Spring: *Tomorrow meet me*
At the green station stop . . .
I smile to dream her silver
And Caribbean trip.

I read the thunder's schedule.
I ask the stars to check
If her bright train is hooting
On time past Martinique,

And if she'll pause at Amherst
This year. I must believe
She pauses there to ponder
Beside her sister's grave

And read her sister's verses,
Which, neat as bumblebees,
Can spring along like robins
And are as twinkling as.

While over trees the April
Breaks golden as Brazil,
And all the swirling robins
Shout like a festival,

And through the honeyed hubbub
The wine of verse is spilled,
I like to think her sister
Wakes toward the summer world.

CARNEGIE LIBRARY OF ATLANTA

Atticus G. Haygood's Thanksgiving Sermon

By FLOYD K. BASKETTE

Floyd K. Baskette, A.B. (Missouri) '32, A.M. (Missouri) '36, is Associate Professor of Journalism. His research for the Ph.D. degree at the University of Wisconsin has involved an extensive examination of the journalism of the Methodist Church in America, in the course of which he found the career of President Haygood of especial interest and significance.

WHEN Atticus Greene Haygood became president of Emory College at Oxford, Georgia, in 1875, the college had an endowment of $13,000, a debt of $30,000, and inadequate buildings for its 156 students. Nine years later, when Haygood left the presidency, the endowment had been raised to $97,000, the debt reduced to $3,000, and new buildings had been erected.[1] Part of this achievement resulted from a Thanksgiving sermon President Haygood delivered at Oxford on November 25, 1880.

The sermon, entitled "The New South: Gratitude, Amendment, Hope," was remarkable in several respects. It inspired a Northern philanthropist to make an initial gift of $10,000 to Emory College; it precipitated a controversy in the Methodist Episcopal Church; it marked the speaker as a progressive reconstructionist and a champion of better education for both the white and the black races.

On that Thanksgiving day President Haygood reviewed the South's restoration from war and its aftermath. Never before in history, he reminded his audience, had a defeated minority regained such power and influence as the South had done from 1865 to 1880. This progress could continue, he said, if the people would recognize their faults and try to reform. He listed these faults as intense provincialism, illiteracy among both whites and blacks, lack of a literature, inadequate schools, and backwardness in developing manufacturing interests.

The South could take hope, he maintained, if it would develop

[1] Henry M. Bullock, *A History of Emory University* (Nashville: Parthenon Press, 1936), pp. 168-75.

the virtues of industry and economy in business, cultivate the sentiments and habits of political and social toleration, as well as respect for law and authority, and stop using politics as a trust and a trade.

This challenge for a New South came from a man who was more than an obscure president of a small Methodist college in the deep South. Already he had distinguished himself in the Methodist Episcopal Church, South, as a Sunday School Secretary and editor of books for the Sunday school libraries. In addition to being president of Emory College, he also was editor of the *Wesleyan Christian Advocate*, the official organ of the Georgia and Florida Methodist conferences.[2]

The Thanksgiving sermon was published in pamphlet form and soon attracted attention, especially in the North. James M. Buckley, editor of the New York *Christian Advocate* (official publication of the Methodist Episcopal Church), reprinted the sermon in his paper. George I. Seney, a New York railroad capitalist and a prominent philanthropist, ordered 10,000 copies of the pamphlet for distribution among his friends.[3]

In February 1881, while President Haygood was in New York looking after the publication of his book, *Our Brother in Black*, Mr. Seney sent for the Emory president and offered to give him $10,000 toward the endowment of Emory College. Haygood cheerfully accepted the gift, and in a dispatch to the Atlanta *Constitution* announcing the donation challenged any Georgia Methodist to contribute a like amount.

A week later came an attack from E. Q. Fuller, editor of a Northern Methodist paper in the South, the Atlanta *Methodist Advocate*. An ardent supporter of the work of the Northern Methodists in the South, Fuller interpreted Seney's gift as evidence that Southern Methodists were bidding for Northern support. In a biting editorial, "Changes That Pay" (February 23, 1881), Fuller accused Seney of making the donation to obtain Southern patronage for his Metropolitan National Bank of New York, and for the

[2]The Emory University Library has a valuable collection of scrapbooks and other source materials on Bishop Haygood, the gifts of Mrs. Mamie Haygood Ardis and the late Dr. A. G. Haygood Jr., both of Downey, California.

[3]Elam F. Dempsey, *Atticus Green Haygood* (Nashville: Methodist Publishing House, 1939), p. 397.

New York Methodist, an independent religious paper in which Seney had an interest.

Fuller depicted Haygood as an intense Confederate leader who had "implored divine wrath upon the Yankees, that Confederate bullets might go straight to the hearts of northern hirelings, and that hell might swallow them up quickly by wholesale." The Yankee gift, he said, was intended to inculcate Northern ideas at Emory College. This statement may have been made for the purpose of stirring up Southerners to oppose the gift.

On March 30, 1881, Fuller wrote another editorial, "Under Which King?", in which he contrasted the large sum Seney had given to Emory College, "owned and controlled by the wealthy, the aristocratic, and thus far the ruling element in the South," to the total contributions of the entire Northern communion for educational work among the "neglected, laboring, and oppressed whites." He even hinted that Emory College students, in carrying out the persecution of Northern Methodists, had burned the Northern church's school buildings at Oxford.[4]

In less drastic language, a few other Northern Methodist editors, particularly those in charge of the Pittsburgh and North-Western *Christian Advocates,* urged the Northern brethren to pay more attention to their own church's work in the South.

Buckley of New York, on the other hand, took issue with his fellow editor for imputing evil motives to Seney. In a long editorial titled "The History of a Serious Matter" (May 26, 1881), Buckley termed Fuller untrustworthy, and pointed out that Haygood could hardly have been an intense Confederate leader, because he was a minor when the war broke out. (Haygood, as a young preacher, did serve as a chaplain in the Confederate army.) Furthermore, said Buckley, it was unfair to link the burning of the Methodist school buildings at Oxford with the Haygood administration, because the buildings burned long before Haygood came to Emory College.

Buckley asserted that another liberal-spirited layman, inspired by

[4]Old-time residents of Oxford are of the opinion that the Northern Methodist school building was a shed converted into classrooms for the instruction of Negro youths. The author has been unable to find any basis for the accusation that Emory students started the fire.

Seney's gifts, had announced his intentions of making similar gifts, but was dissuaded after seeing Fuller's editorials.

Despite the controversy which his initial gift to Emory College had created, Seney increased his contributions to educational work in the South. By the end of 1881, Seney had given Emory College $130,000, a part of which was used to erect Seney Hall, the main building on the campus. Eventually, Seney's gifts to Georgia educational institutions amounted to $225,000.

Haygood ignored the attacks of the Atlanta *Methodist Advocate*. What perturbed him were the numerous requests from Southerners seeking his aid in getting personal gifts from Seney. "People who have been cursing Yankees and Republicans and Northern Methodists, write to George I. Seney, begging with as shameless pertinacity as the veriest tramp could show! O, it is disgraceful and sickening," he wrote in the *Wesleyan Christian Advocate* (October 29, 1881). Shortly thereafter, he printed a card he had received from "one of the beggars":

_____Ga. October 28, 1881

> Rev A G Hagood dear brother will you pleas rite to Mr Seeny and git me forti dollars i am afflickted with biles and rumatiz and cant do no work i made to bails cotton but it takes it all to by my provisns if Mr Seeny will give me twenty dollas now i will wait on him for the ballance till krismas yr brother in the gospl

Even before President Haygood preached his Thanksgiving sermon he had been pleading for Northern aid and cooperation in improving education in the South, particularly among the Negroes. His book[5] made Haygood the leading spokesman for that cause in the South. He showed the potentialities of the Negro, pleaded for recognition of his rights of citizenship, advocated more schools for the Negro, encouraged Northern interests to continue their aid in behalf of the freedmen, and argued for ownership of land by the Negro.

The title of the book, despite its Christian implications, was

[5]Atticus G. Haygood, *Our Brother in Black: His Freedom and His Future* (New York: Phillips & Hunt, 1881). Also published by Methodist Publishing House, Nashville, 1881. New edition published by Hunt & Eaton, New York, 1889, containing three new chapters indicating the trend of thought in 1889.

enough to make some Southerners resentful. Still smarting under the abuses of the carpetbag regime, too poor to provide education for their own children in many instances, not a few Southerners denounced this radical churchman. For several months following publication of the book, Haygood was not invited to fill a Southern pulpit. Angry sneers of "Nigger College President" greeted him.

Considering the time and the conditions, however, a gratifyingly large number of Southern editors reacted favorably to the book. A reviewer in the Atlanta *Constitution* (May 14, 1881) admitted that some of the facts would not be palatable to "the prejudices of those in the South who insist upon retaining and maintaining their prejudices," but concluded that the purpose of the book would receive warm approval of those in the South whose approval was worth gaining.

Staunch Southern papers, such as the Richmond *Whig*, the Columbus (Georgia) *Enquirer-Sun*, the Chattanooga *Times*, and the Charleston *Courier*, carried friendly reviews.

The Northern press generally hailed the Southern minister who dared to advocate educational equality. General Clinton B. Fisk, Northern educator and reformer, clipped a laudatory review from the New York *Tribune* and sent it to Haygood with this note:

> Haygood—this appears in the Tribune Sunday, June 5—and thinking you might not see it early, I clip this and mail to you at once—I have read your book with great satisfaction—I have heard no word of fault with it North or South, and I heard much about it in Tennessee. You have done a *brave* grand thing. God bless you. Yours, Clinton B. Fisk.[6]

General Fisk could have heard a rumble of protest had he been in Georgia. A. R. Jasy, writing in the Atlanta *Methodist Advocate* (June 1, 1881), said that the book was filled with platitudes and offered no solutions. Editors in some rural areas made the issue "Haygoodism v. Methodism." Some told of Negro women who named their children after Haygood. A writer in the Conyers (Georgia) *Weekly* quipped:

[6] Clipping in Haygood Scrapbook, No. 5 (Emory University Library), p. 64.

> A negro stole a calf to feed the preachers with off Mr. Arnold Whitaker's place last week. Mr. Haygood, here is food for thought.

Haygood's reply to this familiar criticism was that those who had the most to say about the Negro's need of education in morals, as a reason for not educating him in books, were precisely the people who were not doing anything of consequence to educate him in anything.

Significantly, the dominant elements in the Southern Methodist Church approved Haygood's course. Favorable reviews of *Our Brother in Black* appeared in the Nashville *Christian Advocate* (official paper of the Church), the Richmond *Christian Advocate*, and the Raleigh *Christian Advocate*. In 1882, a year after the book appeared, delegates to the Methodist General Conference elected Haygood to the bishopric. He rejected the offer on the grounds that he could be more useful in educational work. Only twice before in the history of American Methodism had bishops-elect declined ordination.

Haygood clung stubbornly to his campaign to improve educational conditions in the South. He drew heavily on his book when he went to Boston late in 1881 to explain "The New South from a Southern Standpoint." He showed the progress of the Southern whites and their steps toward recuperation. "Help us," he urged. "*All* people *must* be educated."[7]

Before the Sunday School Assembly at Monteagle, Tennessee, on August 2, 1883, and again at Chautauqua meetings on August 17, 20, and 24, Haygood argued for education for the Negro. "When a child," he said, "is taught that two and two are four he learns just what a white child learns when he is taught the same proposition."[8]

A reader writing to the editor of the *Wesleyan Christian Advocate* (March 20, 1889) said he did not protest what Haygood had said as much as he did the way the Emory educator brought his attacks against the whites. The "protestor" said that the

[7] *Wesleyan Christian Advocate*, December 17, 1881, and January 14, 1882.

[8] Clippings in Haygood Scrapbook, No. 8, pp. 33, 34, 37-38. See also "The South and National Aid to Education," in *Wesleyan Christian Advocate*, September 5, 1883.

Negroes were better treated in the South than "any class of equally depraved and indigent on the face of the earth." T. L. Gantt, editor of the Athens (Georgia) *Banner-Watchman,* warned that if the South gave the Negro a smattering of book learning it would retire him from the cornfield, and in many instances to the penitentiary.

Haygood's answer to such thinking was, "There is just one way to deal with such facts—change them." (Editorial in *Wesleyan Christian Advocate,* August 6, 1881.)

In long letters to Northern newspapers, Haygood admitted the South's faults of the past, but sought help for her recovery. In July 1881 he wrote to the Chicago *Advance:*

> Before 1861 there was enough Methodist money within two miles of Emory College to have done more for it than all of Georgia did for it; but most of the moneyed men of that day cared little about colleges. They preferred to "buy more negroes, to make more cotton to buy more negroes" ad infinitum. We inherit the debris of that state of things.

Surveying the political and economic conditions in Georgia in 1888, Haygood told members of the Few and Phi Gamma literary societies at Emory College that Georgia should surrender her title of "Empire State of the South." In his talk (reported in full in the Atlanta *Constitution,* July 1, 1888), Haygood noted that the state paid her governor only $3,000 a year when he needed that amount to spend on hospitality alone. As for the $3,000-a-year salaries Georgia paid her supreme court judges, Haygood said it was little wonder that the decisions of the highest court in the state had no authority outside the borders. He strongly opposed the policy of leasing convicts to private citizens. "Such a state," he said, "very naturally puts a shoddy iron dome on its million dollar capitol." In his opinion, Georgia had no worse enemy than the ignorant legislator "who, in the name of the poor, votes always against appropriations, or for the lowest figure and deceives men, as ignorant as he is tricky, into re-electing him—as a small watch dog of the treasury."

When the Glenn bill was being discussed before the Georgia

assembly, he came out strongly against the measure, which would have prevented white teachers from teaching in Negro schools.[9]

He fought injustice whether it was committed in the North or in the South. He held that lynching, for instance, was a crime in the North as well as in the South. When armed Pinkerton troops evicted strikers in the Pittsburgh coke regions, Haygood protested in the Atlanta *Constitution* (April 22, 1891): "What right have these killing Pinkertons—mere Hessians fighting anywhere and anybody for pay—to hold mobs in check, to put down rioters, to evict strikers?" The only difference between lynching in the South and lynching in the North, he said, was that in the Northern states certain rich corporations hired the Pinkertons to do their lynching for them instead of doing it themselves.

Haygood was gravely concerned over the lynching of Negroes in the South. "Lynching is a crime against God and man," he wrote in an article published in *The Forum*.[10] "If a government is so weak or bad that it cannot or will not enforce the law, the remedy is not lynching; it is revolution." To a large degree Haygood blamed reconstruction for the assaults on white women by Negro men. Noble-minded but mistaken missionary teachers from the North, he argued, were more impressive in teaching the young Negro his rights than in teaching him the responsibilities of citizenship. The result was insubordination to the social order. Uneducated Negroes, especially the younger ones, were unfitted for the new order, Haygood said. They needed education in moral obligations as well as in reading, writing, and arithmetic.

In 1882 President Haygood became agent for the John F. Slater fund for Negro education; in 1884 he resigned from Emory College to devote his full time to that commission. When he was invited in 1889 to help build a vocational school for girls at Sheffield, Alabama, he accepted in these words: "For the young men of my race I did what I could in Emory College; for the poor black people I have done my best; if I can, with God's favor, do some-

[9] See editorial, "A Bilious 'Constitution'," in the New York *Christian Advocate*, August 25, 1887, for an account of the support of and opposition to the Glenn bill.

[10] "The Black Shadow in the South," *The Forum*. XVI (October 1893), p. 167 ff.

thing worthy for the white girls of the South, I shall count it among my chief joys." When his church again elected him to the episcopacy in 1890, he accepted.

Whatever success Haygood achieved in bringing the social gospel to the South, he was too far ahead of his time to be appreciated fully. His "new departures" commanded general attention, but the majority of his Southern countrymen turned to more conservative leaders for their social ideas.

The New South still was in the future. The editor of the Richmond *Christian Advocate* observed (May 19, 1881), "The worst thing that can happen to a man in civil or religious life, is to find himself ten paces in front of his fellows. There is ill luck in being ahead of one's age. Such an one is in the Commonwealth of Georgia. His name is Haygood—Atticus Greene Haygood."

Haygood, nevertheless, was optimistic. In his Thanksgiving sermon of 1880 he had declared, "The true golden day of the South is yet to dawn. But the light is breaking, and presently the shadows will flee away."

A Note on the Frontispiece

The portrait of Harvey Warren Cox, first President (1920-1942) and second Chancellor (1942-1944) of Emory University, was painted by the brilliant young Richmond artist, David Silvette. Commissioned as an anniversary tribute from the faculty and administrative staff of the University for the Centennial, it was formally presented on the evening of November 6, 1935. The presentation address was made by Dean Goodrich C. White and the acceptance by W. D. Thomson, Executive Vice-President of the Board of Trustees. The portrait is distinguished by a straightforward, masculine realism of treatment, notably appropriate to its subject. Dr. Cox is shown seated in a library, an open book on his knees, looking directly out of the canvas. Dark browns, blues, and greens predominate. The picture hangs above the landing on the delivery floor of the Emory University Library.

Alexander H. Stephens Papers in the Emory University Library

By JAMES HARVEY YOUNG

Professor Young, who returned from an Army assignment to the Department of History at the beginning of the winter quarter, has graciously consented to make a preliminary survey of the most recent acquisition to the manuscripts division of the Emory University Library.

THE Alexander H. Stephens manuscripts recently acquired by the Emory University Library from the estate of Alexander W. Stephens include many historically significant documents pertaining to the career of one of Georgia's outstanding statesmen.[1]

The vice-presidency of the Confederacy was the apex of Stephens' long career of political service to Georgia, the United States, and the Confederacy. Born on a Georgia farm, orphaned at fourteen, Stephens was graduated from the University of Georgia at twenty and admitted to the bar at twenty-two. Two years later, in 1836, he was elected to the Georgia legislature, where he served, except for a year, until elected to the national House of Representatives in 1843. Independent in judgment and impatient of party restraint, he remained in Washington, first as a Whig and then as a Democrat, until the general Southern exodus on the eve of the Civil War.

Despite an extremely slight stature and a shrill voice, he was an incisive, effective speaker and a skillful parliamentarian. In the days of growing tension between North and South, Stephens, while warning the North not to antagonize the South unduly, worked and spoke for measures aimed at bridging the widening sectional gulf. He ardently supported the Kansas-Nebraska Bill, which posed popular sovereignty as the solution for slavery in national territories. He strove in Congress and in Georgia for acceptance of

[1] Biographies of Stephens include: Henry Cleveland, *Alexander H. Stephens in Public and Private*, 1866; R. M. Johnston and W. H. Browne, *Life of Alexander H. Stephens*, 1878; Louis Pendleton, *Alexander H. Stephens*, 1908; Eudora R. Richardson, *Little Aleck, A Life of Alexander H. Stephens*, 1932. Stephens' own *A Constitutional View of the Late War Between the States*, I, 1868, II, 1870, contains much political autobiography. Ulrich B. Phillips' sketch in the *Dictionary of American Biography*, XVII (1935), pp. 569-75, is an excellent summary.

the Compromise of 1850. And in the critical election of 1860, he stumped his native state in support of Douglas, in the belief that Douglas' election offered the greatest chance for preserving the Union.

After Lincoln's election, Stephens pleaded with the Georgia legislature, met to consider a secession convention, to engage in watchful waiting with regard to Republican policies rather than in precipitate secession. Lincoln wrote Stephens requesting a copy of this address. In the secession convention Stephens again suggested efforts at reconciliation, but when the convention voted for secession, Stephens, a firm advocate of states' rights, bowed to the will of the majority, and, like Lee, went with his state.

As Vice-President of the Confederacy, Stephens maintained his states'-rights convictions and became a vigorously outspoken critic of President Davis, insisting that Davis' suspension of *habeas corpus,* establishment of martial law, and conscription policies were tyranny as despotic as that which precipitated the secession of Southern states from the Union. Davis and Stephens engaged in an icy correspondence concerning the latter's strictures of the President.

Stephens was particularly interested in the exchange and parole of war prisoners, and he made an abortive effort in 1863 to hold a conference with Lincoln concerning the improvement of exchange regulations. He was the leading Confederate commissioner to the Hampton Roads conference in February 1865, where he and two colleagues discussed possible peace terms with Lincoln and Secretary of State Seward. The conference failed because the Confederates insisted on Southern independence, or an armistice while this question was negotiated, whereas Lincoln demanded a return of the seceded states to the Union and no cessation of fighting short of the end of the war and the disbanding of all Confederate forces.

Stephens, Davis, and a number of Confederate cabinet members and Southern governors were imprisoned by the Federal government within a month after Lincoln's assassination. Stephens, taken into custody at his home in Crawfordville, was held at Fort Warren in Boston Harbor from May 25, 1865, until his release on parole on October 13, 1865. After his return to Georgia, Stephens

publicly advised his fellow Southerners to support President Johnson's reconstruction policies, to exercise self-discipline, to avoid recrimination, and to treat the freed slaves with good will, in order that the wounds of war might rapidly heal. He was a bitter critic of the recriminatory Congressional reconstruction policy which was enacted instead of the lenient plan of the President. In 1868 and 1870 Stephens published the two volumes of *A Constitutional View of the Late War Between the States,* a detailed apologia for the Southern cause, in which he reaffirmed his conviction in the states'-rights theory.

Stephens engaged in law practice in the Georgia courts after the war, as he had done from time to time throughout his political career.[2] For several years he controlled the policy of the Atlanta *Southern Sun.* In 1872 he was sent once again to the national House of Representatives, where he served for a decade until elected governor of Georgia in 1882. After a few weeks in office, Stephens died on March 4, 1883.

Constantly consulted for his opinion on state and national political issues, Stephens carried on an extensive correspondence throughout his adult life. The collection recently secured by the Emory University Library contains well over a thousand letters. The majority are addressed to Stephens, although a considerable number of letters, and drafts of letters, written by him are included. Correspondence to and from Alexander H. Stephens' half brother, Linton, a prominent figure in Georgia politics, forms part of the collection.

Throughout most of his life, Stephens and Robert Toombs, United States congressman from Georgia, Confederate Secretary of State and general, were close friends, despite occasional differences of political opinion. The Emory collection contains over 150 letters from Toombs to Alexander and to Linton Stephens, written between the 1840's and 1882. Some half of these letters, expertly

[2]An ingenious criminal lawyer, Stephens' successful defense of a slave accused of poisoning her master's family by putting buckeye in the coffee reads like the contrived plot of an Erle Stanley Gardner detective story. Alexander W. Stephens, *Sketch of Alexander H. Stephens,* 1940, 2, 3. Stephens' views of legal education and his conception of legal and political philosophy are admirably set forth in an 1871 letter that has been edited by Dean C. J. Hilkey, Lamar School of Law, Emory University, "The Study of Law," *American Bar Association Journal,* XVI (May 1930), pp. 329-34.

edited, have been published by Ulrich B. Phillips in "The Correspondence of Robert Toombs, Alexander H. Stephens and Howell Cobb."[3] Phillips selected the most informative letters relative to the careers of Toombs and Stephens and those providing the most significant data concerning the state and national political scene, especially during the growth of the secession movement and the war. Of the Toombs letters not published by Phillips, most deal with personal matters and private law practice, although a number contain significant assertions concerning issues and leaders. Southern suspicion of President Buchanan, for example, is apparent in 1857: "His mind can not stay maid [*sic*] up.—a bad sign."[4] In 1863 Toombs shares Stephens' antagonism to the "stupid malignant wretch Davis" and also is critical of Lee: "He has not sufficient genius to command an invading army."[5]

Of the letters in the newly-acquired Emory collection, Phillips has published the most significant among those to Stephens from Howell Cobb, Georgia statesman and Confederate general; Joseph E. Brown, Georgia Civil War governor; Thomas W. Thomas, Georgia judge and Confederate colonel; Benjamin H. Hill, senator from Georgia both to the Confederate and the United States Senate; and Dudley M. DuBose, son-in-law of Toombs and Confederate colonel.

Political and social history of importance is contained in many letters to Stephens not published by Phillips. The following examples are illustrative rather than exhaustive. A month before the outbreak of war, Raphael Semmes, later to assume command of the *Alabama,* writes from Massachusetts discussing the difficulties he was encountering in buying arms and munitions for the Confederacy.[6] General Beauregard discusses the strategy of General McClellan, and in a postwar letter keenly analyzes the political ineptitude of President Grant;[7] on the other hand, Linton Stephens writes a friend condemning Beauregard's lack of security regula-

[3] *Annual Report of the American Historical Association for the Year* 1911, II, 1913.
[4] Robert Toombs to Alexander H. Stephens, February 25, 1857.
[5] Robert Toombs to Linton Stephens, July 19, 1863.
[6] Raphael Semmes to Alexander H. Stephens, March 8, 1861.
[7] G. T. Beauregard to Alexander H. Stephens, August 27, 1861, and November 2, 1868.

tions.[8] The Confederate Secretary of the Navy, S. R. Mallory, confides naval plans, especially relating to the procurement of ships in England and France.[9] Later in the war the Confederate Secretary of War, Leroy P. Walker, concurs with Stephens relative to Davis' "absolute military despotism," and considers the potentialities of a negotiated compromise peace.[10] Postwar political plotting between Northern and Southern Democrats is reflected in a series of letters from Clement L. Vallandigham, the North's most notorious "Copperhead" during the war, who was exiled to the Confederacy for pronouncing disloyal opinions.[11] Sharply-etched pictures of the cruel schism of allegiance in Kentucky and of the severe shortages of troops, food, clothing, and equipment in the Confederate army appear in several letters from General Humphrey Marshall.[12]

The exchange of letters between Davis and Stephens, the latter's epistles in draft, stimulated by Stephens' published inference that Davis preferred the election of Lincoln to that of McClellan in 1864, are included in the Emory collection.[13] Also present is correspondence between the two executives preliminary to Stephens' unsuccessful attempt to confer with Lincoln in 1863 concerning prisoner exchange regulations.[14]

Many of Stephens' own letters in the collection relate to family affairs and to his law practice. His script was small, hastily-written, and all but illegible at times. Even his brother Linton on one occasion was provoked to complain: "If Solomon had seen this specimen of chirography, he never would have written that there

[8] Linton Stephens to Richard M. Johnston, August 8, 1861.

[9] S. R. Mallory to Alexander H. Stephens, June 15, 1861.

[10] L. P. Walker to Alexander H. Stephens, April 8, 1864.

[11] C. L. Vallandigham to Alexander H. Stephens, April 29, 1866, May 14, 1866, May 18, 1866, July 16, 1866, October 21, 1866, and June 16, 1868.

[12] Humphrey Marshall to Alexander H. Stephens, August 11, 1861, November 30, 1861, December 14, 1861, and February 22, 1862.

[13] Most of this correspondence is published in *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies,* Series IV, Volume III (1900), pp. 840, 934-40, 1000-04.

[14] Stephens' letter to Davis, June 12, 1863, suggesting such a mission, is printed in his *A Constitutional View of the Late War Between the States,* II, pp. 558-61. Concerning the background of this mission, a letter from Stephens to Linton Stephens, June 3, 1864, in the Emory manuscripts, is quite significant.

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is nothing new under the sun."[15] A number of the personal letters have been cited in the biographies of Stephens by Cleveland, Johnston and Browne, and Richardson.

Unpublished indications of Stephens' attitudes abound in the correspondence, most, however, substantiating information already published: his vigorous opposition to the anti-Catholic, anti-foreign Know-Nothing party that flourished in the prewar decade,[16] his bitter antagonism toward Davis' alleged despotism,[17] his conviction of the inadvisability of Negro suffrage during reconstruction.[18] An indication of Stephens' venomous hatred of abolitionists is provided by his reaction to the Sumner-Brooks affair. Senator Sumner of Massachusetts, on the floor of the Senate, May 19 and 20, 1856, had directed studied abuse at an absent Southern senator, employing the most scurrilous epithets. Preston Brooks, a relative of the abused senator and a member of the House of Representatives, had retaliated by beating Sumner to unconsciousness with a cane. This incident, fanning the flames of sectionalism still higher, evoked from Stephens this comment: "Brooks whipped Sumner the other day as you will see. It is all right *me judice*. The abolitionist [*sic*] howl over it—and cry out for liberty of speech. I have no objection to the liberty of speech when the liberty of the cudgel is left free to combat it."[19]

During the four and a half months in 1865, while Stephens was a prisoner at Fort Warren, he kept a diary in two blank ledgers bought from the prison sutler. These volumes, measuring 8½ by 13½ inches, three-quarters bound in leather, and containing 510 pages of Stephens' script, form a most significant part of the collection.

In his first entry, Stephens made clear that the diary was being

[15]Linton Stephens to Alexander H. Stephens, May 20, 1868. Other correspondents objected also. William M. Thomas wrote Stephens on January 4, 1863, that he and "two or three good readers" had tried "until night by candle light" to decipher one of Stephens' letters without complete success.

[16]Alexander H. Stephens to W. Akin (draft), April 22, 1855.

[17]Alexander H. Stephens to Howell Cobb (draft), September 29, 1863; Stephens to H. W. Hilliard (draft), September 12, 1864; Stephens to William W. Boyce (draft), October 13, 1864.

[18]Alexander H. Stephens to E. M. Chapin (draft), March 29, 1867.

[19]Alexander H. Stephens to T. W. Thomas (draft), May 26, 1856.

written for the information of his relatives and friends should he not survive the uncertain days that lay ahead. Yet it is obvious that the diary served its author as a friend when lonely and as a confidant when afflicted with bitter nostalgia; long passages seem written from the soul, divorced from the self-consciousness inherent in diaries directed to the eyes of posterity. Thus the diary is a subjective record of a prisoner's kaleidoscopic moods.

The diary contains much else. Stephens recorded the details of the dreary day-by-day routine of prison life: the diet, the comparative freedom of walks in the prison yard, the cheerful company of a mouse. He kept a record of his expenses and transcribed his correspondence. He recorded his terrifying dreams and his mellow daydreams of imagined conversations with old friends. An inveterate reader, Stephens entered long passages of exegesis on his matinal Bible reading, especially in *Job* and *Jeremiah,* and he penned long glosses stimulated by his reading in Aristotle, Cicero, Bacon, Swedenborg, Prescott, Arnold.[20] He quoted poetry and hymns. He entered vivid recollections of experiences in his early years: his entrance examination at the University of Georgia, consisting of spot translation from Cicero; his visit to the site of Atlanta in 1843; his contacts with ministers while defending alleged murderers in the courts. He discussed comets, ocean currents, magic squares. Cued by current newspaper articles, he crystallized his defense of prewar and war political decisions and actions, thus, in effect, laying the foundations for *A Constitutional View of the Late War Between the States.*

At some later date Stephens evidently reread his diary, making minor emendations and scratching out words and short passages. The diary was edited by Myrta Lockett Avary and published in 1910.[21] The published version is considerably shorter than the manuscript, with omissions consisting primarily of details of prison life and long quotations from and comments concerning Stephens' read-

[20] The classical and Biblical influence on Stephens' oratory is well illustrated in *Address of Hon. Alexander H. Stephens, before the Few and Phi Gamma Societies of Emory College, Oxford, Ga., on Commencement Day, July 21, 1852,* 1852. A copy of this pamphlet is shelved in the Treasure Room of the Emory University Library.

[21] *Recollections of Alexander H. Stephens, His Diary Kept When a Prisoner at Fort Warren, Boston Harbour, 1865.*

ing in the Bible and the classics. In her introduction, the editor explains her general method of excision "in reducing the matter to publication limits," and admits to revision of phraseology. Rephrasing and punctuation changes occur on almost every page of the published edition. The editing, while omitting much of interest, seems not to have changed markedly the tone of the manuscript.

Because of the prolific scope of Stephens' correspondence, his letters have found their way into many private and public manuscript collections throughout the country. The largest collection of Stephens papers is housed in the Manuscript Division of the Library of Congress. The Treasure Room of the Emory University Library contained, prior to the acquisition of the new material, over thirty Alexander H. Stephens letters, written between 1837 and 1882, with more than half of the items written during the 1860's. A dozen letters from Linton Stephens also were in the Emory archives. These letters form parts of the following collections: Stephens, Hambleton, Davis, J. Thomas, and Trammel. The Stephens manuscripts recently acquired, of course, supplement even as they overshadow the Stephens material already in Emory's possession. By way of illustration, the new material contains at least two letters to Stephens from James P. Hambleton, shrewdly analyzing Radical Republican plotting during 1866;[22] these letters supplement a dozen letters already on file, penned between 1860 and 1872, by Stephens to Hambleton.

The Stephens collection considerably enhances the manuscript resources of the Emory University Library. Research potentialities for students in the Graduate School are notably expanded in the fields of Confederate biography and history and in the wide domain of Georgia culture, especially in its political and social phases, for the important decades between the 1840's and the 1880's.

[22]James P. Hambleton to Alexander H. Stephens, May 11, 1866, and August 7, 1866. In the earlier letter Hambleton reports just having seen President Johnson, "haggard, restive" as result of his contest with the Radicals.

Public Relations Under Fire

By BRADFORD D. ANSLEY

Bradford D. Ansley, A.B. '39, entered the U. S. Naval Reserve as an Ensign in April 1942. His first assignment was as a public relations officer in Headquarters, Seventh Naval District, Miami. Following a year's tour of duty in the Caribbean and South America on the staff of a Fleet Air Wing Commander, he was named Officer-in-Charge of a Combat Photographic Unit in December 1944, and assigned to the Staff, Commander in Chief, Pacific Fleet and Pacific Ocean Areas. By now promoted to Lieutenant, Ansley took part in the amphibious operations against Okinawa and Iwo Jima and in aerial missions against the Japanese homeland, and was awarded the Commendation Ribbon. Since his separation from the service he has joined the staff of the Alumni Association of Emory University.

IN May of 1942, when the Pacific war was still a nightmare of defeat and despair, the first reports began to reach the United States of a great air-sea battle in the Coral Sea, that strange, far-away body of water in the southwest Pacific bounded by the Great Barrier Reef and the largely uncharted Solomons, New Hebrides, and Loyalty Islands. The U. S. Navy told in glowing terms of a great victory over the Japanese fleet—of ships sunk and planes shot down. But there was no answer to the inevitable question, "What price did we pay for this victory?" To that question there was only official silence . . . silence, and the dread rumors that began to take shape . . . silence, and the loud claims of Tokyo radio of American ships sent to the bottom and American planes knocked down.

Less than a month later, from far to the north, came disturbing word of secret Japanese fleet movements in the hidden reaches of the central and northern Pacific. Great task forces were eastward-bound in a weather front that covered their progress from the outer island strongholds of the Rising Sun.

Then, miraculously, on June 6, news of another great sea victory for the United States west of Midway. The Nip fleet dispersed and fleeing, battleships and aircraft carriers sunk by Navy carrier planes and Army Flying Fortresses.

A great victory, one that turned the tide of Jap conquest—but

still no word of American losses, of the price paid in ships and lives for the triumph.

As the weeks dragged on, a steady trickle of naval officers and men began flowing through west-coast ports and dispersing to shore stations in the States. Into Miami came the men of the ship's band from the *U.S.S. Yorktown,* one of our greatest carriers. There was no explanation for the sudden transfer of this unit from the ship, nor was any reason given for certain vacancies in complement which had to be filled with new musicians.

At last, from Washington, came the sad news everyone had been expecting and which, in many places, had been an open secret for weeks. The U. S. Pacific fleet had lost two of its most powerful fighting ships, the aircraft carriers *Lexington* and *Yorktown,* in addition to other light units, most of which went unnamed. On June 13, the Navy revealed that the *Lexington* had been sunk on May 8th, over a month before, by our own gunfire after a raging gasoline fire had swept through her whole structure and gutted most of her compartments. On September 16 America was finally told that the *Yorktown,* damaged in the battle of Midway, had been sunk by a Japanese submarine on June 6 while trying desperately to reach Pearl Harbor for repairs.

After the long-delayed release of the news of the loss of these two ships, there arose a tremendous clamor in the American press. Why was news like this withheld from the public for so long? The Japanese had long claimed the sinking of these ships. Why was their loss kept a secret by the Navy? Were the brass hats trying to cash in on their victories without taking responsibility for their defeats? Why had the Navy on July 14, over a month after the sinking of the *Yorktown,* said in a communique that the ship had been "damaged"? The press and the people didn't like this situation and they were vociferous in their criticism.

Upon the shoulders of a few criticized and largely misunderstood officers and men in the Navy's Office of Public Relations fell the task of trying to explain. Disliked and derogated alike by the Navy and the public, this small group of former newspaper and radio men, now in uniform as reserves, found themselves in the middle of a raging controversy, hinging on the contention of the press that

the American people had a right to know the truth about the progress of the war, and the knowledge in high quarters in the Navy Department that to release such news prematurely would be to violate the first taboo of wartime public relations, giving "aid and comfort to the enemy" by confirming losses at which Nippon's war lords may only have guessed.

Public relations in the Navy, as such, was very young in these days. Prior to Pearl Harbor, the Navy's contacts with the press and public had been managed by a handful of officers working under the Office of Naval Intelligence. By the very nature of their identification with Intelligence, public relations officers approached any given problem with the wrong slant, an attitude of "tell 'em as little as possible." Professional Navy men, with little or no background in public relations or publicity work, operated on the presumption that the less they told the fewer mistakes they would make.

With the war, Secretary Knox transferred public relations out of Intelligence and set it up as a separate office under the direct cognizance of the Secretary of the Navy. This was a step in the right direction, but it did little to change the long-prevalent attitude on the part of the high naval command that silence was the best policy. And, in addition, the new office was still headed up by senior officers in the regular Navy who were in a position to quash pretty effectively any liberal tendencies on the part of the reserves who were beginning to flow into the ranks.

Improvement in this condition was gradual, but with public clamor over the *Lexington* and *Yorktown* incidents, many highly placed officers realized that something had to be done. In the eyes of the admirals, there had been good and sufficient reason for the delay in announcing these sinkings. The *Lexington* had still been afloat when the last Japanese planes had disappeared to the westward after the attack. She had been sunk by our own ships, and there was a chance that the Nips might not know she had gone down. The Pacific fleet had reason to believe that the submarine which had fired the fatal torpedoes into the *Yorktown* had been sunk before she had a chance to inform the Jap command of her feat. Silence in these cases was felt to be justified because of the technical issues at stake.

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There was no doubt, however, that, right or wrong, the Navy needed badly to build up public confidence in what it was doing. Naturally the explanations given for holding back news of this kind must wait until the news was released, and even then all the reasons could not always be given.

These stormy days saw the real birth of public relations in the naval service. Public relations had always had a bad sound to the public ear. John Citizen saw the P. R. officers and men who manned naval district offices in the States, and he felt that they were "desk chair admirals" and "stateside commandoes." He had no way of knowing about the public relations men who hit the beaches at Guadalcanal and stood battle stations while their ships fought out the blazing battles of the Solomons, the Gilberts and Marshalls, the Philippines, and the rest. Not even by the Navy, whose uniform they wore, were these men fully accepted. They were eyed with some suspicion by senior officers, because they tried to represent the press in urging the release of more and more information, and their mission was only partly understood by the rank and file of the service.

It was only in the latter days of the Pacific conflict, with the naming of Captain (now Rear Admiral) H. B. Miller to the staff of Admiral Nimitz as officer in charge of all public relations in the Pacific Ocean Areas, that a real feeling of mutual confidence and respect began to develop between the Navy and representatives of the American press. It was in these days that Public Relations at last was allowed the freedom it needed to do the job that had to be done.

As the Pacific conflict moved west in the latter days of 1944 with the operations against the Philippines and the Marianas Islands, Pacific fleet headquarters moved with it. Before the last Japs had been buried in the red-clay soil of Guam, officers and men from Pearl Harbor moved in and began constructing Quonset huts and raw wooden buildings to house the members of Admiral Nimitz's staff. In the early winter, the exodus from far-back Hawaii began and, by the first of the new year, Advance Headquarters of the Commander, Pacific Fleet and Pacific Ocean Areas, was well established in the Marianas.

Moving with the planners, the suppliers, the communications men, and the maintenance staff went a big group of Public Relations personnel. And in their wake came scores of war correspondents, representing all the major newspapers and press associations in the country, plus many not so well known.

Radio studios were built at Guam, to provide facilities for direct shortwave broadcasts to the continental United States. An ultra-modern photographic laboratory went up, housed in a double-decker Quonset hut, and in January, regular transmissions were begun in radio-photo all the way from that far outpost to San Francisco. Barracks were constructed to house the correspondents. Jeeps and command cars came out of the holds of the ships tied up in Apra harbor to carry the news and radio men around the island on their tours of inspection and to the docks and airports where they boarded ships and planes for other areas. A tiny club was built on "The Hill," overlooking the beaches where the Marines landed to fight their way inland for possession of the island, and at four-thirty each afternoon a line formed halfway around the hut for the purchase of rum and coke or whiskey and synthetic lemonade. There was even an ice plant to provide ice for the drinks.

All this was a far cry from the early days of the war, when the writers and broadcasters and photographers slept on the ground or in passageways aboard ship, and had little or no facilities for getting their stories and pictures back to this country. Now they were housed, transported, fed, and treated in almost royal manner. Now their copy was radioed, flown, or rushed by fast ship back to communications centers.

Here's an example of how the new set-up worked:

In the dying weeks of 1944, behind Marine-guarded doors at Pearl Harbor and Guam and aboard the command ships of the Fifth Fleet, the final touches were being put to a huge, paper-bound volume labelled "TOP SECRET" and called by those few who know anything about it, "Detachment."

"Detachment" was the code name for the amphibious operations against the tiny islet of Iwo Jima, in the fog-shrouded Volcano Islands, 750 miles north of the Marianas, directly on the B-29

airway to Tokyo. Unless you have seen such an "Op-Plan" you can have no conception of the unbelievable detail it contains. For months, planes of Marianas-based Navy photographic squadrons had roared in over Iwo at all hours of the day to map its rugged terrain all the way from Mount Suribachi on the southwest to the rocky cliffs that dropped away to the sea in the north. Navy photographers went along when Pacific fleet submarines nosed inquisitively about the beaches of the island. Pictures, made through periscopes poked a few feet out of the water, appeared in the invasion plan-book. Every contingency was allowed for in this amazing volume. Every one of the 800 ships which would take part in the pre-invasion bombardment, the landing and the support operations, had its appointed place and its predetermined mission. Every man in the three Marine divisions assigned to take Iwo was accounted for and his task laid out. The carrier strikes against the home islands which were to provide diversionary support for the operation were described and planned in minutest detail. The tankers that would slip out of Philippine ports and refuel the hard-hitting units of Task Force 58—each had its sailing date, to the hour, and its officers knew exactly where and when they would rendezvous with the carriers, battleships, and cruisers of the striking force.

Toward the back of this all-inclusive volume was a section entitled "Public Relations." That section was just as complete as those covering close air support, troop movements, or logistics.

As the ships of the Joint Expeditionary Force, under Vice Admiral (now Admiral) Richmond Kelly Turner, began to assemble in Pearl Harbor, Leyte, Guadalcanal, Guam, Saipan, Ulithi, Manus, and other far-flung anchorages all over the central and southern Pacific, aboard them went Navy Public Relations officers, to assist the many writers and photographers in getting their material and seeing that it was censored and rushed on its way back to the United States, to arrange transportation to and from the invasion beaches, to set up interviews, organize briefings, and take care of the thousand and one other jobs that arose in getting the correspondents the information they wanted at the time and place they wanted it and then getting the copy out.

The stage was finally set. Each public relations officer and man and each correspondent had been thoroughly briefed on what was to take place. In January, many of them had accompanied transport and amphibious groups on a rehearsal for the operation held at the island of Maui, in the Hawaiian group, south of Pearl Harbor. Aboard command ships radio facilities had been set up to handle the transmission of copy to Guam for relay to papers and wire services in the States. Seaplanes were ready to fly out huge mailbags crammed with film and press material from Iwo down to the Marianas. From Guam and Saipan, reporters and photographers took off in Navy bombing and photographic planes, flew over Iwo and described the setting for the climactic battle soon to begin.

These were the preparations laboriously arranged over the months for the civilian correspondents. In addition, Navy Combat Photographic Units and Combat Correspondents, officers and men of the naval service, were already at sea with the gunfire support vessels and the tiny rocket ships, with transports and fast carrier groups, to supplement the flow of news and pictures from the newspaper and wire association representatives.

On the morning of February 19, 1945, the offshore bombardment of Iwo Jima rose to a crescendo. The morning sun burned away a light fog but penetrated with difficulty the smoke from thousands of explosives on the island. Before dawn, assault troops lined the rails of the transports which had come up during the night, clambered down cargo nets, and put off in the landing boats for the rendezvous two thousand yards off the southeastern beaches, in the shadow of Mount Suribachi. At nine o'clock, the first wave moved in.

What happened from then on is history—history told and photographed by scores of correspondents and cameramen, in and out of uniform. Seventeen hours after that first wave hit the beach, San Francisco papers were on the streets with pictures of the assault boats moving to the attack. Seven hours after the first Marine leaped through the surf and dug into the black sand of the island, a network correspondent was on the air describing what he had seen from a Navy bomber flying overhead.

Yes, all this was a far cry from the early days of the war. It was

more than that. It was a tribute to the officers and men of the Navy's Office of Public Relations. It was a tribute to the courage and foresight of regular Navy Rear Admiral Miller, who battled successfully against the Navy's ingrained fear of public relations. It was a hard, uphill fight for those men, both with a public which didn't understand why it was impossible to reveal certain things and a Navy command which was traditionally secretive. But it was a fight that paid off.

There is much more that could be said about the actual coverage of combat in the Pacific. . . . About the officers and men who risked their lives with little thanks and few medals, on missions where no civilian could be taken. . . . About the correspondents like Dick Tregaskis and Gene Smith, who made landing after landing and showed as much courage and devotion to duty as any marine or sailor. . . . About the breed of correspondents who unfortunately showed neither courage nor devotion to duty, but were satisfied with rewriting the communiques at fleet headquarters.

The significance of the story, however, lies in the revolution that had taken place. In some ways it was a palace revolution forced by circumstances on the Navy high command. In other ways it was a triumph for freedom of the press in America.

There can be no question about the sincerity and zeal of the majority of the reserve personnel who made up Navy Public Relations. They did a thankless job well when finally given the chance. There were mistakes, but those mistakes were increasingly mistakes of commission and not of omission. The admirals who urged secrecy weren't always wrong, and some instances of censorship which the public failed to understand had very real and vital strategic reasons behind them. But, as the war drew to a close, fewer and fewer of the traditional excuses for secrecy were accepted by Admiral Miller and his staff. They fought a winning fight and they fought it on the line that news is the property of the people and the most perishable commodity of all.

The Anatomy of Growth

By JOHN H. VENABLE

John H. Venable, B.S. '29, M.D. '33, is Associate Professor of Anatomy in the School of Medicine. His present research is particularly devoted to the prenatal development of the golden hamster.

THE hatching of an egg or the birth of an animal has never failed to amaze anyone who stops to consider the process. Yet these phenomena are merely incidents in the orderly sequence commonly known as growth. True, such incidents mark the transition from one environment to another and from one physiological state to another; but there are other transitions in the developmental process, less obvious perhaps, though still of great importance to the organism. For instance, who can say when the process of ageing begins, although none can deny its importance to the individual?

Growth, development, differentiation, metabolism, *etc.*, are terms variously applied individually or inclusively to the processes by which the fertilized egg develops into an adult of the species. In one sense, growth implies only an increase in weight or size (such as the growth of a crystal of salt), although in another it has a far more significant meaning. An embryo is not a miniature child nor is a child simply a miniature adult, but rather an organism which differs in proportion, in structure, and in function from the adult it is to become. In the process of development there are continuing changes in intracellular chemistry, in the differentiation of structure, and in the interrelationships of both structure and function. Moreover, the process of ageing begins insidiously while development is still proceeding, and contributes its own continuing revisions until it is obvious that the organism has passed its peak of development and is deteriorating.

Growth, as a process, forms a very complicated pattern consisting of many interrelated factors. Unless analyzed or critically defined it may be a misleading term. Primarily, growth should be considered the aggregate of all changes which result in the alge-

braic sum which is the organism at any of the stages through which it passes: *i.e.,* fertilization, prenatal development, birth, infancy, childhood, puberty, adolescence, maturity, ageing, and death, unless the latter supervenes at some earlier date. As such, growth involves the following essential factors:

Cell multiplication
Increase in size of cells
Accretion or increase in amount of non-living structural matter
Differentiation
  Increase in number of kinds of cells
  Increase in morphological heterogeneity
Metabolism
  Respiration (oxidation)
  Fermentation (glycolysis)
  Catabolism (using up) of protein
  Catabolism (using up) of fat
  Chemical activity, such as pigment formation

"Development refers to the *directive* coordination of these diverse processes into an 'organized heterogeneity'." There are, therefore, types of growth which cannot be strictly said to be developmental. Teratomata are tumors containing hair, teeth, nerve, bone, nails, *etc.;* cancerous growth is characterized by lack of directive coordination except for active cell multiplication; and normal tissues transplanted to culture vessels and grown in tissue culture, also appear to lack coordination.

For an adequate understanding of such an extremely complicated group of coordinated processes it is necessary for the biologist to consider all of the data which may be obtained from as many species as possible and at all ages. The most critical stages are obviously those where the growth rate is low, high, or changing from one ratio to another. For the most part, such stages are also those which can be related to similar stages of other species.

It is generally recognized that the rate of growth, *i.e.,* the amount of change per unit of time, varies widely between different species, and the duration of a phase of growth in one may be greatly different from that of another. For example, the length of prenatal existence varies widely, as indicated in the following table:

Opossum (Marsupial)	12-13 days
Hamster[1]	15 days
Rat	22 days
Rabbit	32 days
Guinea Pig	62 days
Monkey	6 months
Man	9 months
Elephant	20-21 months

Moreover, the age of maturity varies over a wide range, for it is well-known that some animals are quite old within a few years or even months of birth while others live for many years. The rat reaches sexual maturity at 60-70 days and is quite old at two years, rarely living longer than three years. Even more extreme is the hamster, which reaches sexual maturity at 35-40 days and rarely lives much longer than two years. The life span of the dog is less than 20 years, the horse 25-30, the rhinoceros and elephant 50-60 years, while the whale has about the same span as man, who is characterized by a long childhood and late maturity, and reaches puberty only after a dozen years or so.

The geometry of animals is not only species-specific but is significantly related to the processes of growth. Differential growth is, of course, responsible for form, but form and size must be efficiently related to growth. The ratio of surface to volume or size is physiologically important, because, for example, heat produced by metabolism is roughly proportional to mass, while heat loss is proportional to surface area. The only ingress for useful materials and egress for waste products is through the surfaces, so that each unit of mass requires its share of functional surface. Geometrically the surface of a solid body is a function of the square of its linear measurements, while the volume is a function of the cube of the same linear measurements. In other words, the larger a body of given shape, the less surface there is for each unit of volume. One

[1] It will be noted that the hamster, a rodent native to Eurasia, is characterized by the shortest gestation period of all the mammals except the opossum. The opossum has a prenatal existence of a few days less, but is a marsupial, characterized by almost premature birth requiring the use of an abdominal pouch by the young for a considerable length of time. On the other hand, the hamster young seem comparable in development at birth to the newborn of other laboratory animals. The rate of prenatal development of the hamster makes it, therefore, an important laboratory animal for the study of growth.

interesting way in which these mathematical relations have been bypassed is in the folding of surfaces, thereby making them redundant and considerably greater than the surface area of the organ, as in the intestine and in the cortex of the brain. Such geometric relations indicate that there must be a maximum effective size for each cell and each organism. Moreover, every arrangement for mechanical support has a maximum of supportable weight beyond which it is not adequate. For instance, a whale could not exist out of its natural environment, for without the buoyancy of the water it would be crushed by its own weight. There must, therefore, be limiting factors to growth, so that geometry incompatible with the environment will not develop.

By reason of such differences in rate, size, geometric form, *etc.*, the investigator is cautious in the application of data of one species to another. Moreover, man is not as available for the collection of required data as are other species and there is still much to be done. On the other hand, there are many stages where we now have comparable data for man and experimental animals, and it is mathematically possible to correlate the different time-scales. When due allowance is made for biological variation, there is such remarkable conformity to the basic plan that one is justified in many generalizations.

A brief resumé of the early development of a mammal will serve to illustrate the differences between several of the varied processes which are a part of growth. All animals have their beginning in the fertilization of the free egg while it is in transit through the uterine tube. Such union of the two germ cells results immediately in the final modification of the material containing the maternal genes, which play an equal part with the male genes in determining the heredity of the organism. After a number of hours, which probably varies between and in species, the fertilized ovum (egg) divides into two daughter cells (cleavage), the first step in the process of cell multiplication. Each subsequent cleavage division, synchronous for all cells, results in a doubling of the number, until the 16- or 32-cell stage when the divisions become irregular. Eventually the resulting mass of cells becomes hollow, with a small inner mass attached to the inner surface at one pole. This is approximately the

stage of development when the embryo reaches the uterus and attaches itself to the maternal tissues. Differentiation of cells has occurred during this time, for the shell of the cyst will be involved only in the process of attachment to the maternal tissues to form the placenta, while a larger part of the inner cell mass is destined to form the body of the embryo. In fact, there is evidence in lower forms that there is a difference in potentiality of the two cells resulting from the first division.

Cell multiplication is outstanding as the principal process in this early development. The best visualization of the data is derived from a curve which compares the number of cells with age from fertilization. Different species develop at different rates, thereby producing different curves, but in no case is such data necessarily pertinent to the question of volume of the total number of cells. Does it double with cleavage divisions or increase at a slower rate than does cell number?

The developing ovum, during its free phase, is without attachment, and must be dependent on its contents and possibly on the surrounding fluid for the necessary nutrients and respiratory materials. Most descriptions of this process state that although the number of cells is rapidly increasing, the total volume of all cells remains the same, that the volume of the egg is the same as the volume of all of the cells of the group until maternal attachment is accomplished. Obviously, divisional activity requires energy, and energy production requires the destruction of material, which, if not replaced, would result in a decrease in volume. In contrast to the idea of equality of volume at all stages, we have recently been able to measure the volumes of hamster ova throughout the free-stage, and have shown that in that animal the total volume decreases more than 50% in development from the one-cell to the 50-cell stage. Thus the cells of the 50-cell stage are not one-fiftieth the size of the egg but less than one-half of one-fiftieth, or one one-hundredth. This finding is without confirmation in other species, for there is only one similar study where volumes have been accurately determined (though by a different method) for inadequate numbers of rat ova. The reduction in volume can be explained only by loss of water from the egg cells during the unattached existence or

by the metabolism of its contained material to supply needed energy. In support of the latter view is the fact that large granules of yolk, present at the time of fertilization, gradually disappear until none is left at the time of implantation. Disappearance of yolk from the eggs of other mammals has been described, and one is led to presume that, if volume is maintained in such a case, it must be due to inbibition of water or other materials. Many studies of eggs of other animals are needed to clarify this question.

Upon attachment to the maternal tissues, the organism acquires a new source of nutrients and respiratory materials, *i.e.*, the maternal blood, and the rate of growth rapidly increases, there being a greater increment during each period of time than in the preceding one. At this time the inner cell mass loosens to form a cavity, the floor of which is reduplicated to form a second layer followed by the appearance of a third between. Rounding up of the three-layered disc produces first a cup-like structure which by narrowing its opening becomes closed into the hollow body. By means of differentiation the various tissues and organs are derived from each of the three layers of tissue, and systems begin to appear in much too complicated a pattern to be discussed here. At the time specific for the species, the individual reaches a stage of development compatible with a different environment (for example, adequate heat control, adequate digestive ability, and adequate motor ability for respiration), and the incident of birth marks the transition to a new environment and the changes thereby implied. In the normal course of events (barring sickness or accident), the further stages of development appear in natural sequence, as everyone has both experienced and observed.

Once having recognized a process, the tendency is always to measure it. Growth consists of so many divergent processes, all fitted together in a coordinated whole, that it is necessary to sort out various factors for measurement, and this is not always easy.

One of the most obvious measurables is that of mass (or weight), although it must be remembered that a child is not a miniature adult. Weight can be measured and graphed in many ways. One can plot the increase in weight per unit of time, the

percentage increase in weight at instants of time, or the total weight at given ages (the cumulative growth).

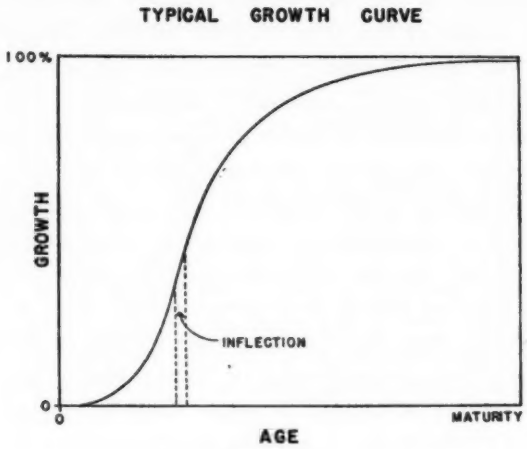

Figure 1

In all forms for which data are available, the latter method of cumulative growth yields a rising S-shaped curve when weight or population is plotted against age. At its beginning the slope of the curve is minimal but rapidly becomes steeper and steeper, indicating acceleration in the rate of increment to weight. At some point, however, a maximum inclination in the curve is reached which, although it may be maintained for a short time, is followed by a reverse curve of less and less inclination, indicative of deceleration in the rate of increment. It is possible to generalize in the statement that typical growth curves consist of an early increasing rise, the self-accelerating phase, and a later decreasing rise, the self-inhibitory phase. The two are separated by a segment of curve which is a straight line and indicates the stage of most rapid growth, inasmuch as it is the steepest line in the entire curve. This point or segment of transition is called the inflection. Its characteristics are: (1) stage of most rapid growth, (2) transition from accelerating to decelerating phases, (3) a geometric referent for the determination of equivalence of age of species. It is also quite interesting to note that at the inflection age one finds, for all species adequately

studied, the phenomenon of puberty and the lowest specific mortality rate.

All sorts of growth curves conform to this general pattern. For instance, the same curve will result if the population of a free-growing culture of yeast is plotted against age, or if the weight of a pumpkin is plotted against age. If available data on human population are similarly plotted, the curve conforms to the curve of the self-accelerating phase, and suggests that the inflection may have been reached, a matter of more than casual interest in the analysis of world conditions.

If the data on growth in weight are mathematically handled in such a way as to relate the control points of the various species (such as conception, birth, puberty, and maturity), modified curves are obtained, all of which, nevertheless, present the basic characteristics of the typical growth curve.

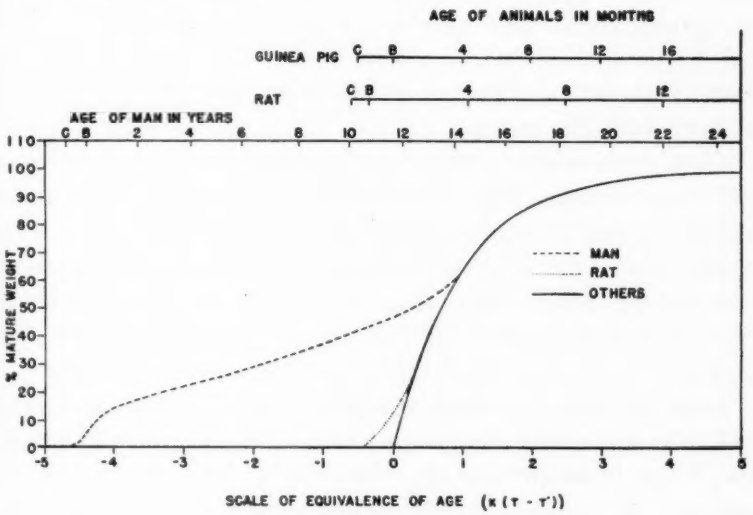

Figure 2

Examination of the figure will reveal three curves, which represent data on man, the rat, and a general group of animals. Equivalence of age (based on the correlation of control points) is indicated at the top for man, the rat, and for the guinea pig as an

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example of the general group. The three curves are basically the same but differ in detail. The data for animals of the general group will deviate from the solid curve very slightly at the lower end, in that they lie just to the left, between it and the curve for the rat, but so close that it is confusing to show them. Consequently, all the curves conform to the basic pattern, although there may be wide quantitative differences; for instance, only in man is there a significant juvenile period. All other animals reach puberty and adolescence much more rapidly.

John Fiske has said, "It is one of the most familiar of facts that man, alone among animals, exhibits a capacity for progress . . . is widely different from other animals in the length of his adolescence and the utter helplessness of his boyhood. . . . I think it can be shown . . . that between these two facts there is a connection that is deeply inwrought with the processes by which life has been evolved . . . that man's progressiveness and the length of his infancy are but two sides of one and the same fact. . . . It is babyhood that has made man what he is. . . . If we came into the world with our capacities all cut and dried, one generation would be very much like another."[2]

Close examination of the early segment of the curve for man will reveal, between birth and conception, an S-shape whose upper end blends with the accelerating phase of the postnatal curve. This is indicative of the different environment and mechanism of nutrition existing before birth. Were it not for the extremely short segment of time involved for the other species, it is probable that they also would show deceleration late in the prenatal period.

Linear growth can be mathematically related to growth in weight and, at least for some dimensions, follows the same general pattern. Its relation to weight, and the relation of both to maturity and to meat and milk production is of obvious value to the dairy industry. Interestingly enough, the curves of milk and egg production conform to the basic S-curve of growth.

The basic biological phenomenon of growth has become well recognized. Analysis of presently available data reveals the possi-

[2]John Fiske, *The Meaning of Infancy* (Boston: Houghton Mifflin Company, 1911).

bility of correlating the process from species to species and emphasizes the usefulness of the generalizations thus derived.

The structure and form of growth are not only of economic and medical importance but may even be socially significant. Population growth may be modified by the exercise of intelligence, just as the "action of the organism as though it desired to maintain itself" may be modified by disease. Current social confusions and disharmony may be transitory and due to "growing pains" associated with the period of most rapid growth in population (puberty?), but the indeterminancy of human behavior makes this a dangerous assumption if we should be led to believe that further maturity will of itself eliminate the problems.

To R.W.E.

A little trickling rill
  Of unregarded song
Creeps from Parnassus Hill,
  Whence rivers great and strong
  Have gushed the ages long.

The little song I make
  With weak and piping phrase
Yet has the power to take
  My thoughts to other days,
  Seen through a golden haze.

To me in Arcady
  Once the bright vision flew
Of heavenly Poesy.
  From the brief moment's view
  Came my songs faint and few.

Now by the tinkling stream,
  Parting the grasses tall,
I cull the flowers that gleam,
  To weave a coronal
  For you, who love them all.

T.H.E.

"E" is for Electronics

By J. B. PEEBLES

J. B. Peebles, B.E. (Union University) '06, M.S. (Georgia School of Technology) '27, is Professor of Engineering. Pan Electronics Laboratories, of which he was one of the organizers, in its brief career played a distinguished part in producing equipment indispensable to the country's war effort.

SHORTLY after Pearl Harbor, our government realized the urgent need for obtaining oscillating quartz crystals by the million. The critical part played by radio communications in this war made necessary an immense amount of electronic apparatus, much of which was not in existence at the opening of hostilities. It therefore requested that any company or organization which had experience in cutting crystals, or could quickly learn the techniques, would get in touch with some of the large industrial companies which had government contracts requiring these units, who were anxious to sub-contract with any organization which could prove its ability by sending in samples or by taking a small educational order and making good.

With this information, Mr. Gilbert W. Withers, of the Withers' Gem and Mining Corporation of Atlanta, contacted Mr. W. F. Ingram, research assistant in the Department of Geology of Emory University, and the writer. We three agreed to do whatever was possible.

A small educational order of DC9s was obtained from the General Electric Company of Schenectady, New York. No one in our organization had any experience in this work, nor did we have any apparatus or machinery suitable to it. With no experience or background, the necessary apparatus seemed impossible to get in those days of tight priorities. However, by advertising in the newspapers of the Southeast and New York City, some second-hand apparatus was obtained, all of which had to be reworked and adapted to crystal making. After several months of hard work, a few diamond saws, a dicing machine and edger, an X-ray with ionization chamber and goniometer, several machine laps, and six or seven electronic mixers and frequency meters with auxiliary apparatus were

completed and tested. Production was then started. Upon studying all available literature on the subject, it was found that no mass-production methods had been worked out at that time, and even laboratory methods were of the trial-and-error type.

Our total production amounted to only from fifteen to twenty-five units per day, and a big percentage of these would fail our test. Thus it seemed that we were getting nowhere rapidly. With the infant plant plodding along at this rate, we decided to do whatever research work was necessary to improve our methods. After about forty-five days of intensive research and study, methods were devised which jumped production to about eighty units per day with only one or two percent of failures. This was real progress, and we felt that with a bit more experience things would start clicking. So it turned out.

We decided to expand the plant, and as there was no room at our present location we moved to the Macmillan Building at 498 Spring Street. We were also able, because of higher production and the improved quality of the product, to obtain more apparatus. It was new this time, and just what we wanted. The number of employees was also increased, until production reached 200 or more tested units per day. Shortly after this the name of the company was changed from Withers' Gem and Mining Corporation to Pan Electronics Laboratories Inc.

Production methods were steadily improved, mainly by limiting each employee to one particular job, this to be a process which should be learned in ten minutes. If it took more than that, it was assumed that the method was wrong, and an easier method was worked out. Women were used in the finishing, dimensioning, and testing departments, and men in sawing and lapping. Later, women were used in lapping.

As each operator became more skilled, production steadily mounted. We made over 40,000 DC9s the first year. This was the crystal which was extensively used by the Army and Navy in the control of their electronic communication systems. Their performance was excellent. So far as we know, not one of our DC9s has failed yet. This crystal, the DC9, was regarded as very difficult to make by the government engineers, and because of our success in

this, we were awarded prime contracts by the Navy for several thousand TBS crystals. These were supposed to be even more difficult than the DC9. After some research, we discovered a method of stabilizing these high-frequency crystals so that their frequency and activity would remain fixed, probably permanently. Samples were sent to the Naval Research Laboratory. The report was even better than we had hoped for, and we received contracts for several hundred thousand TBS, DC11, and other types.

By free use of "Goldberg" methods, imagination and trial and error when nothing else would work, we gradually worked production up and up. At one time the plant staff was about 135 employees. The production at that time was from 500 to 700 units per day. Other time-saving devices and methods were then employed, and we found that we could produce from 800 to 1200 tested units per day with only 100 employees. This was a far cry from the fifteen to twenty-five per day at the beginning.

At no time did we ever have a reject returned to us by the Navy, not a single one, and this out of approximately half-a-million units produced and shipped.

We were also able to drop the prices of crystals tremendously. At first we received $28.50 for a certain crystal. In 1945 the same crystal in a different holder cost the Navy only $3.50, and we made the same profit as before.

Our methods seemed nothing like those used in other crystal plants, except in the sawing and dicing departments. Our closest competitor had about twice the number of employees, with the same rate of production.

One of the main reasons for our success was the high type of employees we were able to obtain. They were keen, and eager to learn. They made every effort necessary to continue increase in production. Some would stay overtime to learn how to use a new piece of apparatus. Some of the girls handled sensitive electronic frequency apparatus with the ability of engineers. Many of them had husbands, brothers, or sweethearts in the armed forces. One was the wife of a general, another the wife of an Emory professor, and still another the wife of a former Emory professor. Both of

the latter handled delicate electronic apparatus where mistakes would have been fatal to production.

To show the response of our employees to the urgent necessities of war production, the following incident, one of several such, may be related.

An Allied aircraft carrier was severely damaged, and limped into an east coast port for repairs. One Wednesday morning we received an urgent telephone call from Washington, ordering us immediately to cease all regular work and make 1000 crystals of a type unknown to us, and to have them ready for shipment by airplane the following Sunday at noon. This seemed an impossibility, as specifications were unknown, and for several hours, data relating to frequencies and activity were not available. There was no time for any preliminary pilot work. The employees were called together and the situation explained. Everyone without exception volunteered to work as long as necessary to complete the order. This meant that many would be without sleep from thirty-six to sixty hours. At that time, April 1944, our past experience helped wonderfully; and although the trial-and-error method was used, failures on our test were not as high as might have been expected. Believe it or not, the last one of the thousand and a few extra was completed by 10 A. M. Sunday, and they were sent on their way. Monday was declared an earned holiday with pay, so that everybody would be fresh and in good spirits on Tuesday morning.

The plant closed its doors on September 1, 1945, since all contracts were cancelled. Pan Electronics Laboratories was one of the relatively few war plants of the nation, approximately six percent, that were awarded the Army and Navy "E," and this to an organization which did not exist at Pearl Harbor and closed its doors on V-J Day.

EDITORIAL

Miranda's words of wonder and delight

> "O brave new world,
> That has such people in't!"

might seem in a contemporary context to possess an irony worlds beyond the dramatic irony that Shakespeare intended. People are what is wrong with the world; its vexatious problems, ever to be solved and re-solved and sometimes defying solution, are grounded in the intractability, not to say depravity, of human nature. The intractability may not be total any more than is the depravity, except in the strictest theological sense. But a view of the world of human nature is distinctly not reassuring.

How hard it is to distinguish friend from enemy. In the one, indeed, we may mark bigotry, hatred, brutality, but in the other no less selfishness, guile, ingratitude. We are sure of our own high-mindedness, but may not high-mindedness in action prove a fatal weakness, leave us unweaponed in the midst of hostile arms? How hollow the lofty idealisms of our own high discourse—freedom, peace, democracy, free enterprise, full employment, collective bargaining—sound from the mouths of others. Nor can the deeds performed under their sanction endure the test of our righteous exegesis.

We acquiesce temporarily to parties, alliances, and leaders; yet we fear nothing more than that they secure the power that will enable them to perform efficiently and with might the tasks for which they were created. Our servants and deputies are kept under jealous observation and correction, although for all our care we are ill served even at home. Abroad, where sometimes under direst stress of circumstance we must entrust our welfare to those of alien interests, we feel that we constantly risk betrayal, taking for granted the will to betray even though opportunity is wanting.

We sometimes imagine that we are ringed about by sinister personifications—Germany, Japan, Britain, Russia, Fascism, Communism, Labor, Capital, a hundred others—that somehow possess independent existences. But these ideological ogres are soon revealed as simply people, sometimes sinister enough under the evil possession of an urge for power, sometimes misled but capable of

being returned to the common ways of life, and sometimes merely misunderstood.

If we are to escape from the waking nightmare whose grip is fastening upon the present generation, we must learn how to deal with people. We cannot with Prospero escape to an enchanted island, there to regain by practice of magic a kingdom lost by abdication. What chiefly concerns us in this world is our dealings with people, as we have proved conclusively by our dealings with things. The surer our technical mastery of things, the more we are forced to recognize our final pitiful helplessness. We must find successful techniques for dealing with people, or we are lost. We must not delegate the effort to one group, even though it embrace the political leaders of the world, for every man's safety is now every man's ultimate problem. Nor can we put our trust in any one device alone, whether force, or law, or universal brotherhood, for the arm of flesh is proved frail, and the arm of the spirit is unexercised and untried in so great a task.

We have achieved a kind of civilization in all parts of the world. People have often demonstrated their ability to live peaceably together. Men everywhere pay lip-service to peace and unity. What is lacking?

May not the fatal lack have been a just respect for the greater potentialities of human nature? If we could make this respect, including self-respect, really efficient, might not the problem of survival be finally solved? In that fantastic horror which appeared shortly after World War I, *R.U.R.*, Dr. Hallemeier, Head of the Institute for Psychological Training of Robots, reflects in the moment just before the destruction of the last members of the human race by the scientific monsters of their creation: "It was a great thing to be a man. There was something immense about it."

Such an afterthought avails nothing on the edge of doom. But if, while we may yet hope to escape the menace that hangs over us, we would take forethought of the greatness, the immensity of human nature, and would diligently and devotedly explore its resources, might we not hope with our own eyes to look upon a brave new world whose Caliban-monsters were rendered impotent to hurt?

T. H. E.

Trail to California

A Review by FLETCHER M. GREEN

Fletcher M. Green, Ph.B. '20, A.M. (North Carolina) '22, Ph.D. (North Carolina) '27, was Professor of History at Emory, 1933-36, and since 1936 has been Professor of History at the University of North Carolina. David Morris Potter, A.B. '32, M.A. (Yale) '33, Ph.D. (Yale) '40, is Assistant Professor of History at Yale University.

The Gold Rush to California in 1849 was one of the most dramatic episodes in the westward sweep of the English-speaking people across the North American continent; it was also the climactic event of that great movement, and a significant factor in United States history. As such it has had a perennial interest for the student of American history and civilization. Hundreds of Forty-niners kept accounts of their trek across the great plains and the snow-capped mountain ranges, many of which have been published. Historians and litterateurs have made extensive use of such documents in the writing of innumerable accounts of the West in American history. Some fifteen years ago Archer Butler Hulbert, using two hundred and fifty such journals, wrote a popular work, *Forty-niners* (Boston, 1931), a sort of composite diary of the Gold Rush. In view of such extensive writing on the subject, one might ask whether the publication of another diary of the Gold Rush is worth while. A reading of the Geiger-Bryarly journal[1] will prompt an emphatic affirmative answer.

Geiger, a young business man of Virginia, and Bryarly, a physician of Maryland, both served in the Mexican War before going to California as members of the Charlestown, Virginia, Mining Company. Geiger, after an exciting political and journalistic career in California, died in Valparaiso, Chile, as a fugitive from justice. Bryarly practiced his profession in California, served in the Crimean War as a major in the Russian medical corps, and then retired, full of honors, to die in his native state. The journal these two men kept on the trek to California (Geiger wrote the first, Bryarly the latter, part) is "straightforward and articulate, detailed and explicit," and is a most interesting travelogue. More important, it is a record of a well-organized party, one of the few that did not go to pieces because of the hardships and difficulties of the journey. As such it is of particular value and gives the reader a graphic picture of the life and experiences of immigrant groups to the Pacific area.

The Charlestown Mining Company was a closely-knit organization, a co-partnership of seventy-five men, each of whom paid $300 for the purchase of company supplies and bound himself not to seek gold individually but to pool the proceeds of his labor with those of his partners and to divide the profits equally. The written constitution of the company also provided military protection and a framework of government for the party. In its latter feature it was typical of pioneer efforts at self-government, and was a sort of traveling republic.

The journey across the continent was filled with hardships. Roads were

[1] *Trail to California. The Overland Journal of Vincent Geiger and Wakeman Bryarly.* Edited with an Introduction by David Morris Potter. Volume XX, *Yale Historical Publications. Manuscripts and Edited Texts.* New Haven: Yale University Press, 1945. xii, 266 pp. $3.50.

non-existent or at best almost impassable; in some places they crossed lands so low and swampy that live stock were bogged down and had to be abandoned; deep and rapid rivers took their toll of men and horses; mountain peaks forced the party to throw away precious supplies; arid plains, where dust storms obscured the horizon, failed to supply forage for horses and oxen or water for the men. Thunder, lightning, hail storms, torrential rainfall, freezing weather, and heat waves added to the burdens; clouds of mosquitoes, cholera, diarrhea, typhoid fever, and fatal accidents could not be escaped. These and many other difficulties had to be met. But all was not woe. Doctor Bryarly, the company surgeon, prescribed brandy, cognac, and other liquors that made the men forget, temporarily at least, their troubles; trout fishing and shooting buffalo and other wild game, dancing to the music of violin and banjo, the singing of songs, visits with traders and immigrant parties, and fireworks on the Fourth of July helped to pass the time and ease the loneliness of separation from home and loved ones. Even so, members of the party were tense, irritable, and more than once almost ready to break up the organization and go their individual ways before they completed the one hundred ten days' journey from St. Joseph, Missouri, to the Gold Diggings of California.

Professor Potter has done a superb job in the editing of the Geiger-Bryarly journal. He has compared it with many others of the fifty manuscript diaries in the William Robertson Coe Collection of Western Americana in the Yale University Library (from which the present journal is taken) together with printed diaries of Forty-niners. In so doing he has given an interesting and worth-while picture of both specific and general experiences of the hundreds of immigrant parties to California. His seventy-three page Introduction is a brilliant exposition and penetrating analysis of the problems of westward migration. The reviewer would, however, question Professor Potter's statement that President James K. Polk "concluded that the Whigs were more dangerous than the Mexicans."

The Supreme Possession

A Review by Lester Rumble

Lester Rumble, A.B. '15, B.D. '21, D.D. '35, is the pastor of St. Mark's Methodist Episcopal Church in Atlanta.

"In this book,"[1] says the author in the preface, "I am eager to present evangelism as both relevant and joyously exciting. I may have fallen far short of my purposes. But if there are even a few readers who are impelled to make religion real by giving, loving, and sharing Christ and in his spirit, I shall count myself most fortunate."

The reviewer feels that he had some part in helping to shape Dr. Jordan's mind with reference to the title of the book. At least, in discussing previous to the publication what the title should convey, the author's purpose for the book was indicated. The title was then chosen for the end desired. A restless

[1] *The Supreme Possession*, by G. Ray Jordan. Nashville, Abingdon-Cokesbury Press, 1945. 187 pp. $1.50.

passion for finding lost persons in the Name of Christ and leading them to the only Saviour is the thread of emphasis woven into the structure of the book. Likewise are there resources for this living. The fifteen chapters are really fifteen tested sermons by the School of Theology's recently appointed Professor of Preaching. Each sermon is pertinent to the goal desired, *viz.*, the arousing of a weary world—and, shall we say, a tired church—to the freshness of the gospel message. The book says to us, "Come alive."

Dr. Jordan's style in writing is his likewise in preaching—simple, direct, driving. His illustrations are apt, fresh, and clinching. The structural beams of his outline are well covered with smooth and easy passage from point to point. His climaxes are usually emotionally arousing, with illustrations fresh from life.

The volume is timely. It will prove stimulating to layman and minister. In this time of renewed emphasis on evangelism in the church, many will be inspired afresh to the "Supreme Possession." Then it will happen with us as the author reminds us it did with Thomas Chalmers—"something marvelous." From that hour we too shall preach and live a saving gospel.

Prologue

By CHARLES R. HART

I would ask much of poetry: to be
  A clearer speech than that of every day,
  Unlike those talks from which I turn away
Bearing unsaid the words I brought with me;
To be a rift in the fatality
  That shuts us heart from heart and mind from mind,
  And we seem callous, when we would be kind,
And men see pride in our timidity.
Hazard attends our talk, too hurried now,
  Now too distraught for converse with a friend.
Perhaps the peace the gods will not allow
  To fevered speech on poems may descend.
Then may I lay my volume at your door
And, by the grace of song, be mute no more.

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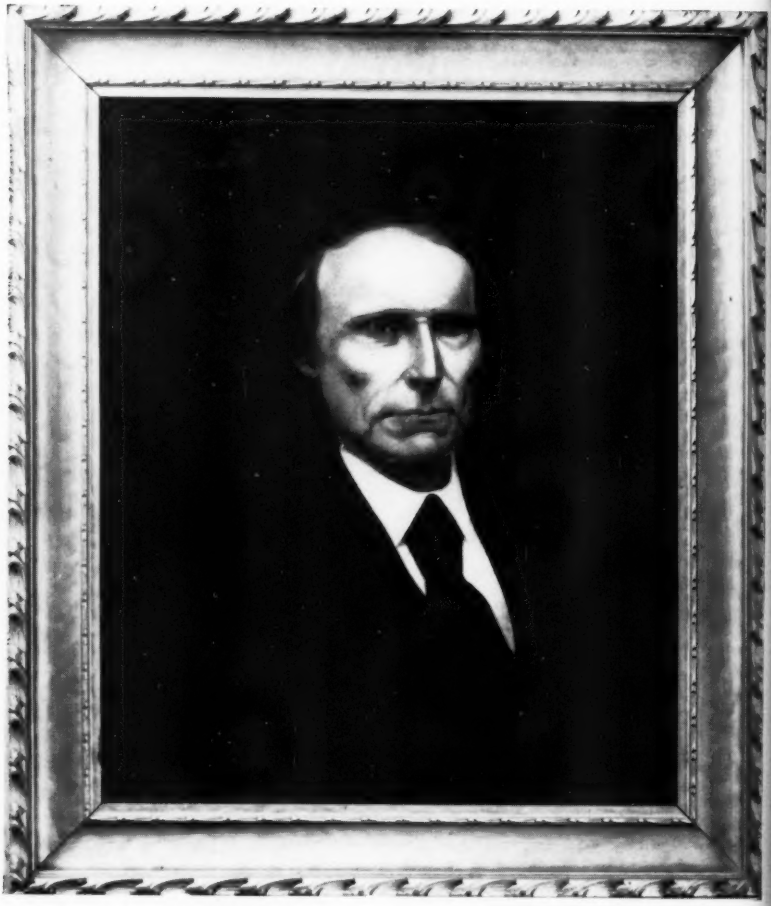

JOHN G. WESTMORELAND [1816-1887]

VI